



A Systematic Approach To Adult Hip Pain, Part 2

In the second part of this two-part article, common conditions that cause hip pain will be examined. Last month, the anatomy and biomechanics affecting the hip, and the approach to evaluating hip pain were covered.

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Adult hip pain is a common problem, affecting over 25% of people with joint-related pain. The complex anatomy of the hip joint and surrounding soft tissues offers challenges to diagnosing and appropriately treating a painful hip. Failure to diagnose and appropriately manage injuries of the pelvis can result in prolonged patient morbidity and, in some cases, mortality. A systematic approach to adult hip pain, including a careful clinical and radiographic examination, will identify the majority of all clinically important

pathologies in this region.

One of every 10 patients with joint pain complain of a painful hip. As a major weight-bearing joint, the hip supports the entire upper body. At the same time, however, it allows for a flexible degree of movement between the lower limbs and the upper body. Any pathology affecting the hip is particularly debilitating because it compromises the patient's ability to ambulate.

Determining the cause of a painful hip can be a major challenge to physicians. A



careful history, physical examination and appropriate investigations can identify the majority of hip ailments. Let's take a look at common conditions that cause hip pain.

Anatomic Classification of Possible Causes of Hip Pain

Hip pain can be caused by a variety of conditions. It is useful to categorize hip pathologies according to the anatomic structures affected. Sources of hip pain can originate from the bone (joint), soft tissue (muscles, tendons, bursa) and/or

nervous tissue. Furthermore, hip pain may be referred from such areas as the lower back.

Bone (Joint)

The most common conditions affecting the hip joint are:

- Osteoarthritis (OA);
- Rheumatoid arthritis (RA);
- Septic joint;
- Tumor (primary and metastatic);
- Trauma; and
- Avascular necrosis (AVN).

Table 1 compares the conditions that affect the bones of the hip joint on the basis of clinical assessment and initial treatment.



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Osteoarthritis

OA of the hip is more common among the Caucasian population, with a roughly equal incidence in both sexes.^{1,2} Although more common in the elderly, it may start at any age, from the second or third decade onward. Most cases are idiopathic, though some are secondary to a congenital disorder or an inflammatory arthropathy.



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Table 1:

COMMON HIP CONDITIONS

	History	Physical	Lab Values	Imaging (X-ray)	Management
Degenerative Arthritis - OA	<ul style="list-style-type: none"> Groin and anterior hip pain Pain worse with activity and can be relieved with rest Morning stiffness Insidious onset and gradual progression 	<ul style="list-style-type: none"> Pain localized to the hip Periarticular muscle atrophy Internal rotation is lost first 	<ul style="list-style-type: none"> Normal CBC Synovial fluid: viscous, cell count < 1000 	<ul style="list-style-type: none"> Narrowing of joint space Bony erosions and cysts Subchondra sclerosis Osteophytes 	<ul style="list-style-type: none"> Weight loss, physiotherapy NSAIDs Corticosteroid injections Surgery
Inflammatory Arthritis - RA	<ul style="list-style-type: none"> Symmetrical, systemic joint involvement Polyarthritis (small joint involvement) Morning stiffness lasts more than 1 hour 	<ul style="list-style-type: none"> Joint effusion Tenosynovitis Nodules Bone-on-bone crepitus 	<ul style="list-style-type: none"> RF found in 85% of cases Increased ESR in 50%-60% Synovial fluid: leuko-cytosis (> 10,000) 	<ul style="list-style-type: none"> Demineralization Joint space narrowing Erosions of subchondral bone Synovial cyst Subluxation 	<ul style="list-style-type: none"> NSAIDs, DMARD, corticosteroids Synovectomy, joint replacement, joint fusion
Septic Joint	<ul style="list-style-type: none"> Pain in the affected hip Pain is usually in the groin and inner thigh, and occasionally radiates to the knee Acute or insidious onset Fever 	<ul style="list-style-type: none"> Fever Unable to weight bear on the affected joint Tenderness and warmth over the hip Hip held in flexion, slight abduction or adduction, and external rotation 	<ul style="list-style-type: none"> Elevated ESR WBC may be elevated Increased PMNs Synovial fluid: grossly purulent with decreased viscosity. 	<ul style="list-style-type: none"> Early: soft tissue swelling and widening of teardrop interval Late: erosion and absorption of surrounding bone 	<ul style="list-style-type: none"> Surgical drainage IV antibiotic Gram stain guides subsequent treatment Physiotherapy
Trauma (Hip Fracture)	<ul style="list-style-type: none"> History of falling Osteoporosis Unable to bear weight on the affected limb 	<ul style="list-style-type: none"> Limb shortened, externally rotated, painful ROM Antalgic gait 		<ul style="list-style-type: none"> Mal-alignment Displaced versus non-displaced fractures 	<ul style="list-style-type: none"> Surgery
Tumor	<ul style="list-style-type: none"> Pain in the affected hip Unable to weight bear Noticeable mass Certain symptoms associated with particular lesions—e.g. osteoid osteoma causes night pain that can be relieved with NSAIDs 	<ul style="list-style-type: none"> Pain upon palpation Swelling Restricted ROM 	<ul style="list-style-type: none"> Biopsy 	<ul style="list-style-type: none"> Soft tissue mass MRI: local osseous extent of tumor, soft-tissue extension, and medullary involvement 	<ul style="list-style-type: none"> Surgical resection of tumor Chemotherapy Radiation therapy
Avascular Necrosis	<ul style="list-style-type: none"> Groin or thigh pain Sudden onset of severe pain related to weight-bearing Worse at night Rapid progression as compared to OA 	<ul style="list-style-type: none"> Hip joint tender to palpation Antalgic gait ROM painful and often decreased in, flexion internal rotation, and abduction 		<ul style="list-style-type: none"> Diffuse osteoporosis and sclerosis of the necrotic region CT: extent or depth of displacement in advanced osteonecrosis MRI (Gold Standard): collapse of femoral head and cartilage degeneration 	<ul style="list-style-type: none"> Early: conservative treatment Late: hip replacement



The condition has a chronic, variable course and often causes considerable pain and disability. The primary event is deterioration of articular cartilage and, eventually, exposed bone. The bone-on-bone contact is the primary cause of pain, as there are many nerve endings at the articulating surfaces within joints. The diagnosis is made by clinical assessment in conjunction with plain radiographs.

Rheumatoid arthritis

RA is a chronic, symmetric, erosive synovitis characterized by a number of extra-articular features. The age of onset is usually between 20 years and 40 years, and there is a genetic predisposition associated with human leucocyte antigen (HLA) DR4/DR1 alleles. The incidence is 0.6 to 2.9 per 1,000 population.² Pathologically, there is hypertrophy of the synovial membrane, causing an outgrowth of granulation tissue (pannus)

into and over the articular surface. This results in the destruction of articular cartilage and the subchondral bone. Joint deformities, such as swan neck, boutonniere, ulnar deviation, hammer toes and flexion

contractures, are often inspected. Patients also may get tenosynovitis.

The hip joint is commonly involved in RA. Early symptoms are subtle, usually involving restrictions of range of motion (ROM). Pain is characteristically felt in the groin or thigh, but may occur in the lumbar spine or knee.

Septic arthritis

Septic arthritis is an emergency situation. Without prompt treatment, permanent joint damage can rapidly result. The bacteria usually infect the joint through hematogenous spread or secondary to osteomyelitis.

It can be occasionally due to trauma or skin infection. *Neisseria gonorrhoea* accounts for 75% of septic arthritis in young adults.^{3,4} *Staphylococcus aureus* affects all ages, and is rapidly destructive. Gram negative affects debilitated patients and are rapidly destructive.

It is important to obtain a culture and sensitivity from synovial fluid, blood, skin, the rectum, endocervix or oropharynx to determine the presence and source of infection.

Tumor

There are a variety of bone tumors, with each being associated with certain signs and symptoms. The general clinical features of a hip joint tumor are outlined in Table 1. In characterizing hip tumors, it is useful to consider the following three parameters:⁵

1. Anatomic location and site of the tumor;
2. Determination of the extent of bone destruction. Large, aggressive lesions with irregular margins or soft-tissue extensions are more often associated with malignancies, whereas smaller and well-confined lesions tend to be benign. On X-ray, benign lesions may have a sclerotic or non-sclerotic border, and a moth-eaten appearance is characteristic of aggressive lesions; and

Canes, crutches and walkers are a common part of the nonsurgical treatment for arthritis of the hip.



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3. The periosteal reaction also indicates the aggressiveness of the lesion. In slow-expanding lesions, the periosteal sleeve may remain intact and continue new bone formation during the expansion. This leads to the appearance of a Codman's triangle or lamellar periosteal reaction, typically called onion skinning. In rapidly growing tumors that extend beyond the periosteal sleeve, the radiograph has a "sunburst" appearance.

In addition to X-rays, computed tomography (CT) and magnetic resonance

imaging (MRI) provide greater detail on the characteristics of the tumor. The most definitive diagnostic tool, however, is a biopsy. Biopsies are indicated in cases of suspected malignancy, selected benign tumors or in cases of an uncertain diagnosis.

Trauma

Trauma to the hip can result in a hip fracture, dislocation, or both. In dislocations, the femoral head can either displace anterior or posterior to the acetabulum. Anterior dislocations occur as a result of



Table 2:

CLINICAL FEATURES OF SOFT TISSUE INJURIES OF THE HIP.

	History	Physical Findings	Special Tests	Treatment
Contusion	<ul style="list-style-type: none"> • Direct trauma to soft tissue 	<ul style="list-style-type: none"> • Pain on palpation and motion 	<ul style="list-style-type: none"> • Plain films are negative 	<ul style="list-style-type: none"> • Rest, ice, compression, elevation, NSAIDs • Ecchymosis • Physiotherapy
Myositis ossificans	<ul style="list-style-type: none"> • Contusion with hematoma approximately 2 to 4 weeks earlier 	<ul style="list-style-type: none"> • Pain on palpation, firm mass may be palpable 	<ul style="list-style-type: none"> • Radiograph or ultrasound reveals typical calcified, intramuscular hematoma 	<ul style="list-style-type: none"> • Ice, stretches, NSAIDs • Surgical resection if conservative treatment fails
Iliotibial band syndrome	<ul style="list-style-type: none"> • Lateral hip, thigh or knee pain • Snapping as IT band passes over the greater trochanter 	<ul style="list-style-type: none"> • Positive Ober's test 		<ul style="list-style-type: none"> • Stretching, ice, NSAIDs • Physiotherapy
Trochanteric bursitis	<ul style="list-style-type: none"> • Pain over greater trochanter on palpation • Pain during transitions from standing to lying down to standing 	<ul style="list-style-type: none"> • Pain on palpation over greater trochanter 	<ul style="list-style-type: none"> • Plain films, bone scan, MRI negative for bony involvement 	<ul style="list-style-type: none"> • Ice, NSAIDs, stretching IT band, steroid injection • Physiotherapy
Iliopsoas bursitis	<ul style="list-style-type: none"> • Pain and snapping in medial groin or thigh 	<ul style="list-style-type: none"> • Reproduce symptoms with active and passive flexion/extension of the hip 	<ul style="list-style-type: none"> • Plain films are negative 	<ul style="list-style-type: none"> • Iliopsoas stretching, steroid injection • Physiotherapy

impact to the knee(s) while the hip is abducted. The patient presents with the limb in flexion, external rotation and abduction. The mechanism causing a posterior dislocation occurs when a force impacts the knee(s) while the hip is flexed and adducted; for example, when the knee(s) hit the dashboard in a car accident. Clinically, the limb is shortened, internally rotated and adducted. With posterior dislocations, sciatic nerve injury is common.

Trauma to the hip also can result in fractures. Structures that can fracture include the acetabulum, intracapsular femoral neck and the extracapsular portion of the femoral neck.^{6,7} These can be

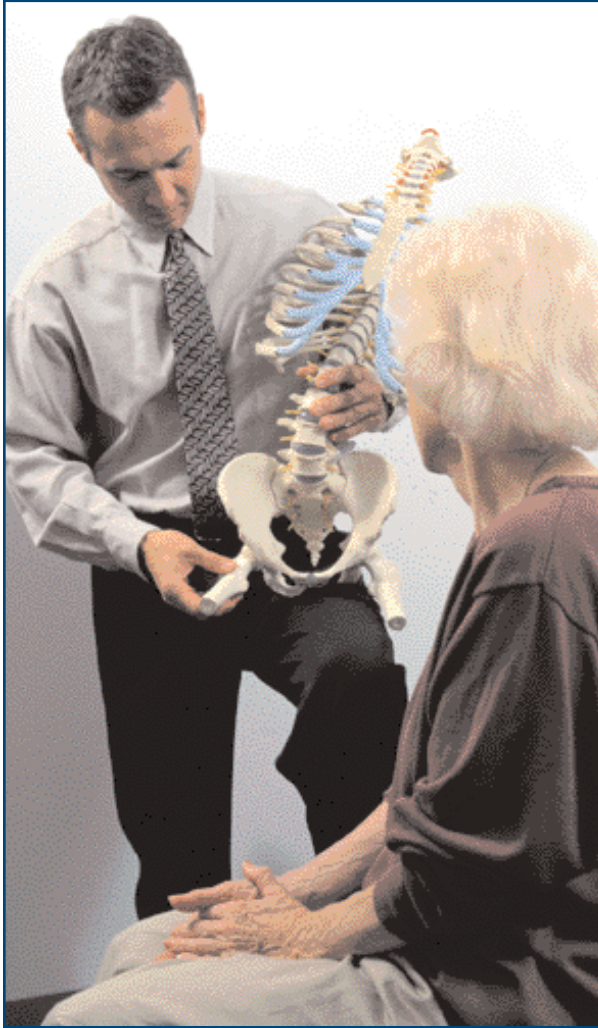
identified on x-ray and require immediate orthopedic consultation.

Avascular necrosis (AVN)

AVN is a condition in which progressive ischemia of the femoral head leads to bone collapse and eventual degenerative arthritis. The common precipitating factor is interruption of blood supply to the femoral head. The most common cause of unilateral AVN is complication from surgery or trauma. Alcoholism and steroid use are the two most common causes of bilateral AVN.⁸ Sudden onset of hip pain without trauma is a common presentation. Early diagnosis has been cited as the single most important factor in treatment.⁹



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Soft Tissue

Strains and tendonitis are common causes of hip pain related to soft-tissue injury. A strain is an acute injury to a muscle or tendon. In contrast, “tendonitis” denotes acute inflammatory tendon changes secondary to overuse. In the anterior hip, the muscles most likely to be acutely or chronically injured are the rectus abdominis, iliopsoas, adductor longus and rectus femoris. Most often, the injuries occur at the muscle-tendon junction.^{6,10} The

most common soft-tissue injuries and their distinguishing features are illustrated in Table 2.

Neuromuscular Problems

The two nerves most likely to cause pain or numbness around the hip are the sciatic and lateral femoral cutaneous nerves. The sciatic nerve includes motor and sensory components that originate from the L4-S3 nerve roots. It passes through the sciatic notch, where it is susceptible to compression by the piriformis muscle (Figure 1). Typical symptoms include a dull ache in the buttock, which may radiate down the posterior thigh. This pain may be difficult to distinguish from radicular pain caused by nerve root compression in the lumbosacral spine. Imaging studies of the spine may be needed to differentiate the two conditions.¹¹

The lateral femoral cutaneous nerve is a sensory nerve. It can be compressed as it passes under the inguinal ligament, especially in obese patients and those with tight-fitting clothing or belts. This condition is known as meralgia paresthetica, and causes numbness or pain over the anterolateral thigh (Figure 2).¹¹

Neuromuscular hip conditions also can be classified as either intrinsic or extrinsic disorders.^{5,8} Intrinsic disorders include spasticity and flaccid paralysis. Among intrinsic neuromuscular hip disorders, the major causes of spasticity are cerebral



palsy, cerebrovascular accidents (CVAs), and spinal cord injuries in the young adult.

The direct cause of hip instability is muscle imbalance, resulting from hip adductors and flexors overpowering the hip abductors and extensors. The intrinsic neuromuscular disorders associated with flaccid paralysis include poliomyelitis, myelomeningocele and Charcot-Marie-Tooth disease.

Extrinsic neuromuscular dysfunctions secondarily involving the hip joint comprise a diverse group of disorders. Although muscle imbalance with hip subluxation/dislocation plays a secondary role, contractures frequently develop. Some of these disorders are associated with spasticity, and others have flaccid paralysis as the dominant feature.

These disorders include: Charcot neuropathic hip joint, Parkinson's disease, multiple sclerosis, adult-onset CVA, upper motor neuron (UMN) injury, head injury and spinal cord injury. It is beyond the scope of this article to describe each of these conditions in detail.

Referred Pain

Radiation from the lumbar spine, discs or nerve roots would be suggested by pain reproduced upon forward sitting. Spinal flexion during anterior sitting is the position that raises the intradiscal pressure to the greatest degree and suggests disc disease.^{12,13} Coughing and Valsalva's maneuver raise intrathecal pressure, stretch irritated nerve roots and worsen discal pain. An abnormal neurologic examination of the lower extremities suggests radiculopathy.¹⁴ Pain also can be referred to the hip from urogenital problems. The history and physical, therefore, may need to be focused on bladder and reproductive organs.

Conclusion

The vast array of hip pathologies can make assessing the adult hip a challenging task. An organized approach will help narrow down the list of possible diagnoses. Most importantly, one needs to consider the location of the pain and inquire about specific characteristics of the pain. The

Valtrex has been shown to abort outbreaks when taken in prodrome.^{1,2}

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*Indicated for treatment of recurrent genital herpes in immunocompetent adults. ¹Valacyclovir 1500 mg PO BID (n = 144), 5 days vs placebo (n = 150) (p < 0.001, 33% of episodes were aborted in valacyclovir-treated patients. Therapy was initiated within 24 hours of first signs/symptoms. ²Excluding U.S. and P.R. Limited use benefit in Ontario.

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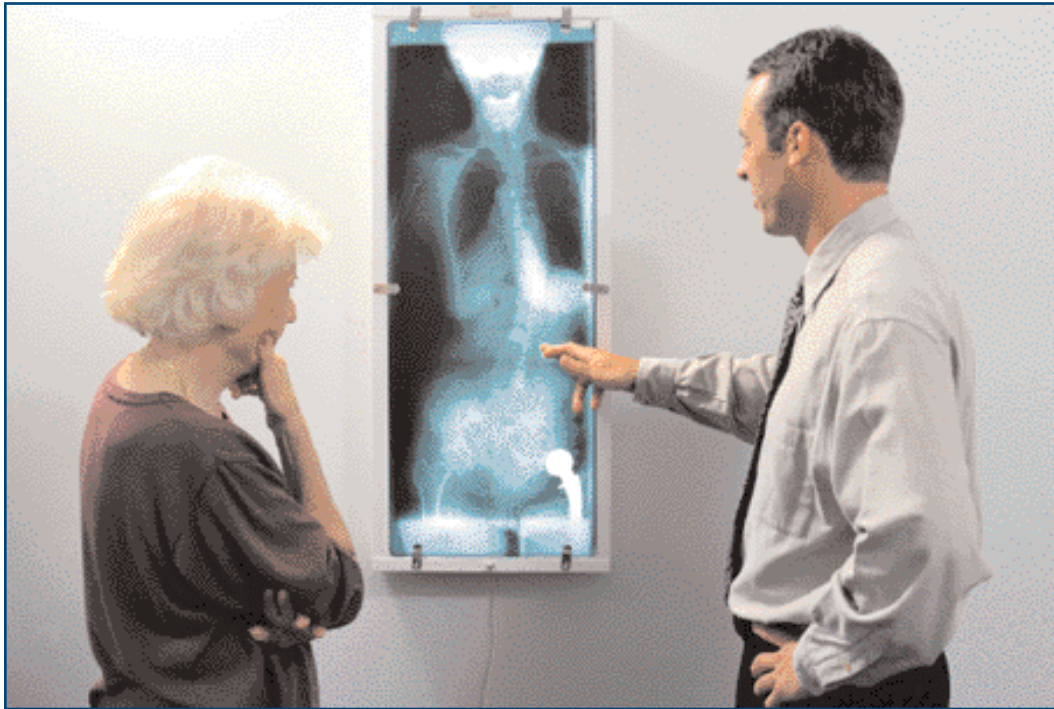
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Turn to page 34 for more information.

Always use as directed



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information gathered from the history will guide the physician in choosing certain special tests during the physical examination. Lab work and imaging are frequently used to better characterize certain pathologies and to confirm or refute the working diagnosis. It is critical to rule out the life-threatening/limb-threatening conditions when there is an index of suspicion. The most common hip conditions have been outlined and their characteristics differentiated.

It is useful to categorize the various pathologies according to the anatomic site they are most likely to affect. It also is helpful to further understand the distinguishing features between each specific condition. Initial treatment often consists of rest, ice, compression and elevation. Pain and anti-inflammatory medications may be used depending on the severity of the patient's symptoms. In many

instances, orthopedic consultation may be necessary. **Dx**

References

1. Dieppe P: Management of hip osteoarthritis. *BMJ* 1995; 311:853-7.
2. Garcia-Porrúa C, Gonzalez-Gay MA, Corredoira J, et al: Hip pain. *Ann Rheum Dis* 1999; 58(3):148-9.
3. Mandell BF: Septic arthritis. *Sci Am Med* 1998; 15:1-8.
4. Gentry LO: Osteomyelitis. *Sci Am Med* 1998; 16:1-7.
5. Callaghan JJ, Rosenberg AG, Rubash HE: *The Adult Hip*. Volume 1. Lippincott-Raven, Philadelphia, 1998, pp. 1-50.
6. O'Kane JW: Anterior hip pain. *Am Fam Physician* October 1999; 6:1-13.
7. Lyons AR: Clinical outcomes and treatment of hip fractures. *Am J Med* 1997; 103(2A):51s-64s.
8. Hedger S, Darby T, Smith MD: Unexplained hip pain: Look beyond the obvious abnormality. *Ann Rheum Dis* 1998; 57(3):131-3.
9. Mansour ES, Steingard MA: Anterior hip pain in the adult: An algorithmic approach to diagnosis. *J Am Osteopathic Assoc* 1997; 97(1): 32-8.
10. Kagan A: Rotator cuff tears of the hip. *Clinical Orthopedics and Related Research* 1999; 368:135-40.
11. Adkins S, Figler R: Hip pain in athletes. *Am Fam Physician*, April 2000; 4:1-14.
12. Fagerson T: *The Hip Handbook*. Butterworth-Heinemann, Boston, 1998.
13. Magee DJ: *Orthopedic Physical Assessment*. W.B. Saunders, Philadelphia, 1992, pp. 460-503.
14. Roberts N, Williams R: Hip pain: Systematic approach to diagnosis. *Primary Care* 1988;15:783-93.