HIP PAIN – COMPLETE GUIDE TO CAUSES, PATHOLOGY, DIAGNOSIS & MANAGEMENT

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1. Introduction

Hip pain is a common yet often complex complaint affecting individuals across age groups and activity levels. The hip joint bears heavy loads and supports mobility, stability and weight-bearing, so any disruption in its integrity—whether from joint degeneration, tendon/ligament injury, bursitis, or even referred pain from the spine—can significantly affect quality of life. This guide aims to provide a **comprehensive overview** of hip pain: its causes, pathological mechanisms, diagnostic pathway, and management options, with an emphasis on evidence-based practice and practical clinical utility.

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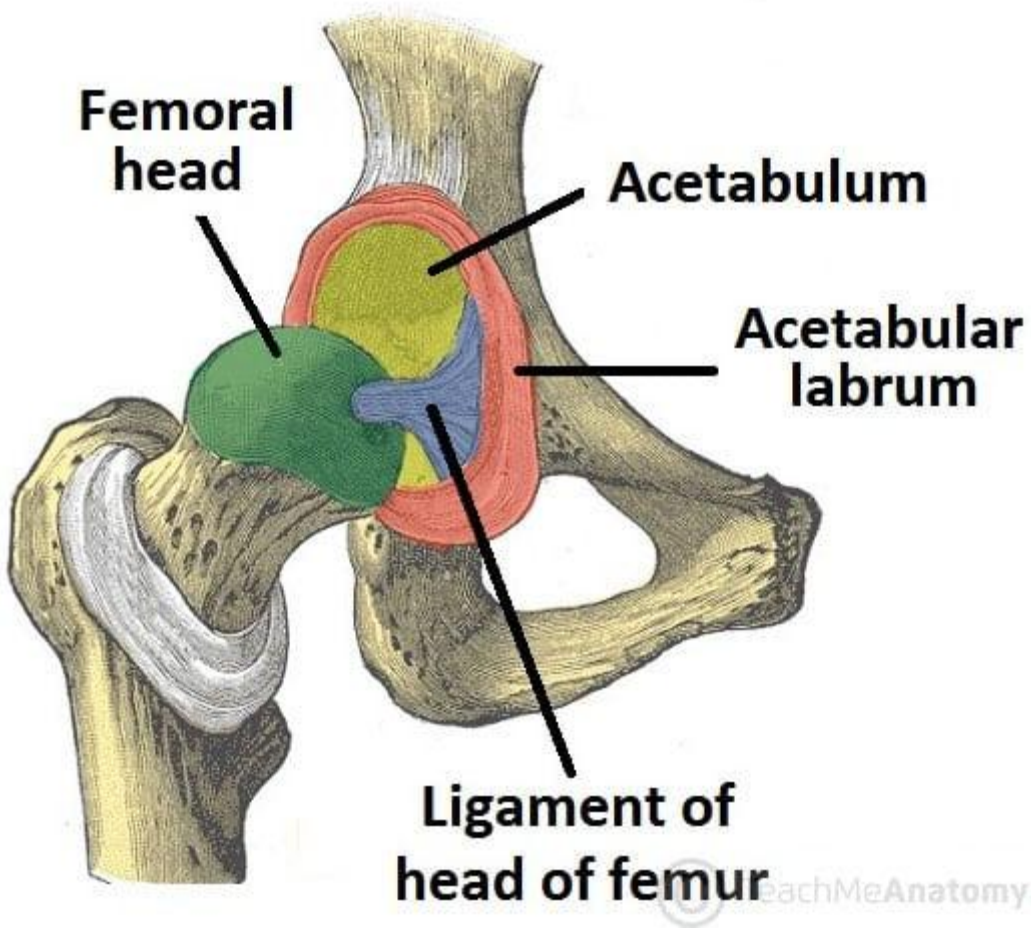
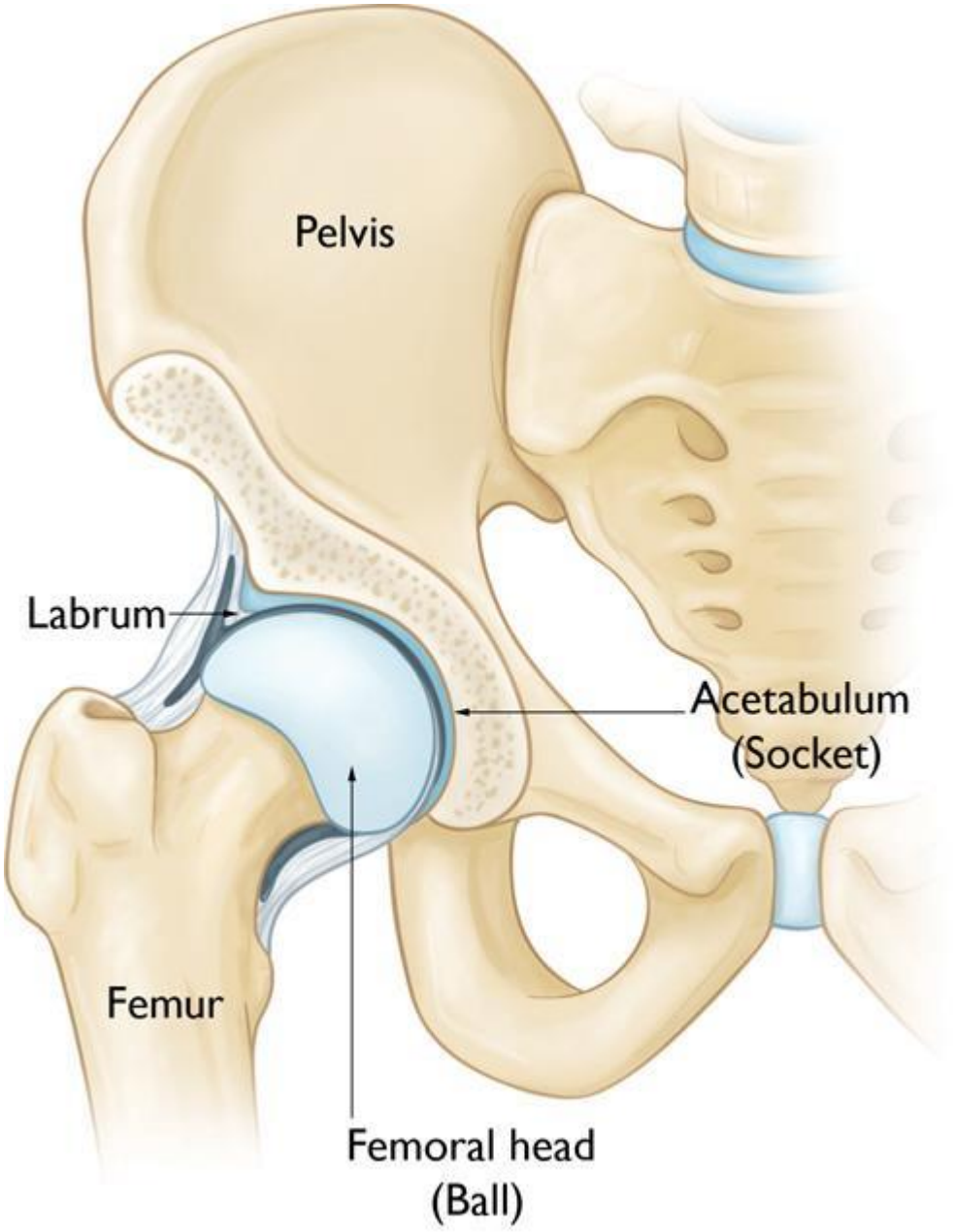
2. Anatomy & Biomechanics of the Hip


Femoral head
Acetabulum
Acetabular labrum
Ligament of head of femur
TeachMeAnatomy



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- The hip is a **ball-and-socket synovial joint**, formed by the femoral head (ball) and the acetabulum of the pelvis (socket). Orion Ortho+2Cleveland Clinic+2
- Important structural components: articular cartilage covering bone surfaces; the acetabular labrum (a fibro-cartilaginous rim around the acetabulum); the capsule and ligaments (iliofemoral, pubofemoral, ischiofemoral); surrounding musculature (flexors: iliopsoas/rectus femoris; extensors: gluteus maximus; abductors: gluteus medius/minimus; internal/external rotators). Orion Ortho+1

- Biomechanics: The hip supports body weight in stance, transfers loads during walking/running, allows large ranges of motion (flexion/extension, abduction/adduction, internal/external rotation). Any abnormal load-bearing, altered alignment or traumatic insult may lead to structural damage.
- Because the joint is deep, with strong muscular envelope and many nearby structures (pelvis, spine, hip flexor region, gluteal region), pain may originate from intra-articular structures, peri-articular soft tissues, or be referred from other sites.

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3. Epidemiology & Clinical Significance

- Hip pain is prevalent in all ages but the underlying causes vary with age and activity level. In adults, for example, degenerative hip disease (osteoarthritis) becomes increasingly common after age 45. AAFP+1
- In younger active individuals (athletes, dancers), structural causes such as Femoroacetabular impingement (FAI) or labral tears are more frequent. AAFP+1
- Chronic hip pain impacts mobility, gait, quality of life, work productivity and may lead to early joint replacement if not identified and managed timely. AAFP+1
- From a public-health perspective, hip pain and hip joint pathology carry significant cost burdens (e.g., joint replacement, rehabilitation). AAFP

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4. Pathophysiology & Classification of Hip Pain

Hip pain may be classified broadly into: intra-articular (within the hip joint), extra-articular (around the hip joint), and referred pain/mimics from nearby structures. Understanding the pathology helps guide diagnosis and management.

4.1 Intra-articular causes

These originate within the hip joint itself:

- **Hip osteoarthritis (OA)**: progressive degeneration of cartilage, joint space narrowing, osteophyte formation, subchondral sclerosis. It often presents after middle age. Cleveland Clinic+1
- **Avascular necrosis (AVN) of the femoral head**: compromised blood supply → bone-death → collapse of femoral head → secondary arthritis. Physiopedia
- **Labral tears & cartilage damage**: the acetabular labrum may be torn due to trauma, repetitive micro-instability, or as a consequence of FAI or dysplasia. ScienceDirect+1
- **Femoroacetabular impingement (FAI)**: due to abnormal bony morphology (cam- or pincer-type) → impingement of femoral neck on acetabular rim → labral/cartilage injury. Neurohirurgija+1
- **Hip dysplasia / developmental abnormalities**: shallow acetabulum, abnormal mechanics → early joint degeneration. Physiopedia
- **Loose bodies / intra-articular fractures / synovial disease**: less common but relevant (e.g., slipped capital femoral epiphysis in younger patients). ScienceDirect

4.2 Extra-articular causes

These originate from peri-articular soft tissues (tendons, bursae, muscles) or superficial bony prominences:

- **Greater trochanteric pain syndrome (GTPS)**: common cause of lateral hip pain. Involves gluteus medius/minimus tendinopathy, bursitis of trochanteric bursa. AAFP+1
- **Hip bursitis**: trochanteric, iliopsoas, ischial bursae may be inflamed. Physiopedia+1
- **Tendinopathy/tear of gluteus medius/minimus, hamstring, iliopsoas**: often in athletes or with overuse. Neurohirurgija
- **Snapping hip syndrome**: the iliotibial band or iliopsoas tendon snapping over bony prominence may cause pain or audible/snapping sensation. ScienceDirect+1

- **Muscle strain, apophysitis, trochanteric avulsion**: especially in younger active patients.
- **Soft tissue problems around the hip joint or gluteal region**.

4.3 Referred pain & mimics

Pain perceived at the hip region might not originate from the hip joint or adjacent tissues; it may be referred from other structures:

- Lumbar spine (disc disease, facet arthropathy, spinal stenosis) → buttock or groin pain. AAFP
- Sacroiliac joint dysfunction. ScienceDirect
- Pelvic/abdominal pathology (gynecologic, urologic) when pain is anterior in nature. AAFP
- Non-musculoskeletal causes (infections, tumors) though rarer.

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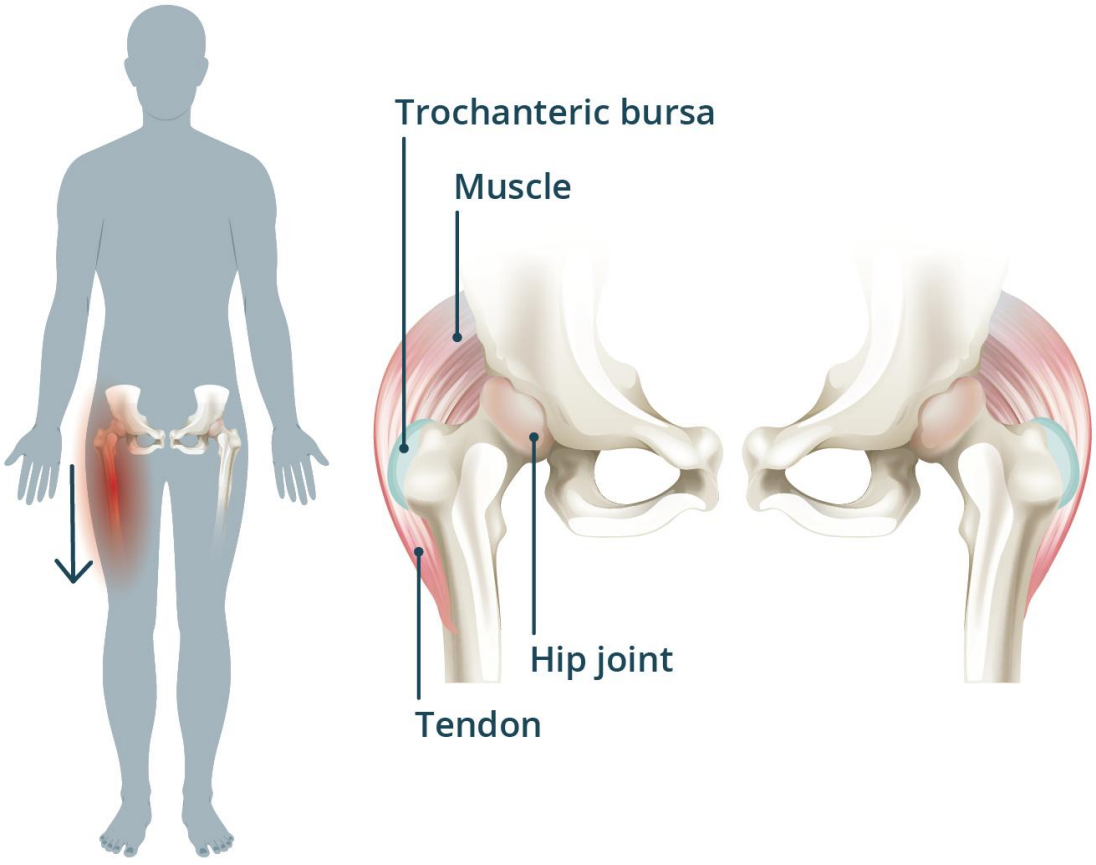
5. Clinical Presentation & Symptom Patterns

Greater trochanteric pain syndrome (GTPS)

Lateral pain extending from the hip down into the thigh.



Understanding the typical presentation helps narrow the differential diagnosis:

- **Pain location**:
  - Anterior/groin: often intra-articular pathology (labral tear, FAI, OA). AAFP
  - Lateral (outer aspect of hip): often extra-articular (GTPS, bursitis). PMC+1
  - Posterior/buttock: may be referred from spine, sacroiliac, or deep gluteal syndrome. AAFP
- **Quality of pain**: Dull ache, sharp stabbing, catching or locking, mechanical symptoms (clicking/giving way) in labral tears. Neurohirurgija+1
- **Aggravating/relieving factors**:
  - Activity (walking, climbing stairs, pivoting).
  - Sitting for long periods (especially on involved hip) – factors in trochanteric bursitis. PMC
  - Morning stiffness (common in OA).
  - Mechanical catching/locking (in labral/cartilage lesions).
- **Associated symptoms**: Limping or Trendelenburg gait (gluteal insufficiency) AAFP; difficulty in putting on socks/shoes (hip stiffness) Neurohirurgija; referred symptoms (leg pain/tingling) from spine.
- **Red-flags** necessitating urgent evaluation: sudden inability to bear weight (possible fracture/dislocation), hip swelling/redness/fever (possible infection), night pain unrelieved by rest (possible avascular necrosis or tumor).

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6. Diagnostic Approach

A structured diagnostic pathway is critical to pinpoint the source of hip pain and guide effective management.

6.1 History & physical examination

- **History**: age of onset, onset pattern (gradual vs acute), precipitating event (trauma/sport/overuse), location of pain, radiation, aggravating/relieving factors, mechanical symptoms (clicking/locking), previous hip/spine pathology, systemic symptoms (fever, weight loss), activity level, prior surgery.
- **Physical examination**:
    - Gait assessment (Trendelenburg sign, limp).
    - Observation of hip, pelvis, lower limb alignment.
    - Palpation: greater trochanteric region, anterior hip, groin, gluteal region.
    - Range of motion: flexion, extension, abduction/adduction, internal/external rotation – noting pain or restriction.
    - Provocative tests: e.g., FADIR (flexion/adduction/internal rotation) and FABER (flexion/abduction/external rotation) to assess intra-articular pathology.
    - Strength testing of hip abductors, flexors, extensors.
    - Examination of lumbar spine and sacroiliac joint when appropriate.
      As documented in literature, a focused physical exam is highly sensitive for localising the hip as the source of pain, but less accurate in specifying the exact pathology. RACGP

6.2 Imaging & other investigations

- **Plain radiography** (AP pelvis & lateral/proximal femur views) is the first-line investigation for bony abnormalities, joint space narrowing, osteoarthritis, fractures. AAFP+1
- **MRI**: excellent for soft-tissue, cartilage, labral pathology, avascular necrosis. Particularly when intra-articular pathology is suspected. AAFP+1

- **CT scan**: useful for detailed bony morphology (FAI, dysplasia, complex fractures) or surgical planning. Orion Ortho
- **Ultrasound**: useful for superficial structures (bursae, tendons), dynamic assessment (snapping hip), and for guiding injections. Neurohirurgija+1
- **Bone scan / SPECT**: sometimes used in occult fractures or when metastasis/infection is suspected. Orion Ortho
- **Laboratory tests**: in cases of suspected inflammatory arthritis, infection, metabolic bone disease: ESR/CRP, rheumatoid factor, HLA-B27, calcium/VitD/alkaline phosphatase etc.

6.3 Diagnostic injections & advanced tests

- **Ultrasound-guided or fluoroscopy-guided intra-articular hip injection** (local anaesthetic ± corticosteroid) may help differentiate intra-articular vs extra-articular sources of pain. AAFP
- **Provocative intra-articular block**: relief of pain after injection suggests joint as pain source.
- **Dynamic ultrasound**: to evaluate snapping phenomena, bursitis/tendinopathy. Neurohirurgija
- **Arthroscopy**: sometimes diagnostic and therapeutic for labral/cartilage lesions.
  It's important to interpret imaging findings in the context of clinical presentation – incidental changes (especially in older adults) may not equal pain generator. Neurohirurgija+1

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7. Management Strategies

Treatment is tailored based on cause, severity, functional impact, patient factors (age, comorbidities, activity level). The management spectrum ranges from conservative to surgical.

7.1 Conservative (non-surgical) management

- **Activity modification / load management**: avoid aggravating movements (deep flexion, repetitive pivoting), reduce high-impact activity. Orion Ortho
- **Analgesics & anti-inflammatory medications**: e.g., NSAIDs, acetaminophen for symptomatic relief. Cleveland Clinic
- **Cryotherapy/thermotherapy**: ice for acute inflammation, heat for stiffness. Cleveland Clinic
- **Physical therapy**: key component. Focus on:
  - Hip abductor strengthening (gluteus medius/minimus)
  - Core stability, gait training
  - Flexibility of hip flexors/hamstrings/IT-band
  - Correcting biomechanical deficits (leg length discrepancy, foot mechanics)
    Neurohirurgija+1
- **Weight management**: especially in OA, reducing load on the hip improves symptoms and outcome. Orion Ortho
- **Walking aids**: cane on opposite side may reduce load. Orion Ortho
- **Bursa/tendon management**: for bursitis or tendinopathy – rest/NSAIDs/physical therapy.

7.2 Minimally invasive interventions

- **Ultrasound-guided injections**: corticosteroid into bursa/tendon sheath or intra-articular injections for arthritis or labral pathology. Neurohirurgija+1
- **Platelet-rich plasma (PRP)**, viscosupplementation: emerging therapies in tendinopathy or early joint degeneration. Orion Ortho
- **Diagnostic/therapeutic arthroscopic lavage/debridement**: in selected cases of extra-articular bursitis or intra-articular loose bodies. Neurohirurgija

7.3 Surgical treatments

Indicated when structural abnormalities or damage are significant, and conservative/less invasive treatments have failed.

- **Hip arthroscopy**: for labral tear repair, FAI correction (cam/pincer resection), cartilage debridement. AAFP+1
- **Core decompression / bone grafting**: for early avascular necrosis of femoral head. Neurohirurgija
- **Osteotomy / hip preservation surgery**: in hip dysplasia, young patients to delay arthritis.
- **Total hip arthroplasty (THA)**: for advanced hip osteoarthritis, large femoral head collapse (AVN), hip joint failure with pain, stiffness, functional impairment. Cleveland Clinic+1
- **Revision surgeries**: in failed prior surgery or implant failure.

7.4 Rehabilitation & Preventive Strategies

- After any surgical or non-surgical treatment: structured rehabilitation to regain strength, mobility, gait pattern, return to sport/work.
- Preventive measures:
    - Maintain healthy body weight and BMI
    - Warm-up/cool-down routines before/after sports
    - Avoid repetitive high impact loads without rest
    - Strengthen hip abductors/core to ensure hip stability
    - Correct leg length discrepancies, foot/ankle mechanics
    - Ergonomic modifications for sitting/standing jobs to reduce hip joint stress.
      Cleveland Clinic+1

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8. Special Populations / Unique Situations

- **Athletes / younger adults**: labral tears, FAI, stress fractures (femoral neck) must be considered early. RACGP

- **Older adults**: OA, fractures (even low-trauma hip fractures), trochanteric bursitis more common.
- **Post-trauma cases**: Dislocations, fractures, avascular necrosis risk.
- **Pregnant women**: Pelvic girdle changes, hormonal influences (relaxin) may affect hip girdle.
- **Children/adolescents**: Conditions such as Legg-Calvé-Perthes disease, slipped capital femoral epiphysis (SCFE) lead to hip pain and long-term consequences. Physiopedia
- **Systemic disease contexts**: Rheumatoid arthritis, ankylosing spondylitis affecting the hip; metabolic bone disease (osteoporosis) contributing to fracture risk.
- **Post-operative or prosthetic hip scenarios**: Pain may be from implant loosening, infection, periprosthetic fracture.

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9. Prognosis & Long-Term Outlook

- The prognosis depends on cause, severity, timing of diagnosis, and adherence to management.
- Many cases of hip pain (especially from soft-tissue or early degenerative changes) respond well to conservative management and avoid surgery. PMC+1
- Delayed diagnosis of structural hip pathology (labral tear, FAI, hip dysplasia) may lead to progression of joint damage and earlier need for joint replacement. AAFP
- Advanced hip osteoarthritis or collapse from AVN often requires hip replacement; with modern implants and programmes, outcomes are generally good but success depends on pre-operative functional status, comorbidities, and post-operative rehabilitation.
- Preventive strategies (weight control, muscular strengthening, biomechanics) can improve outcomes and delay progression.
- Patients with hip pain should be counselled that while complete pain-free recovery may not always be possible (especially in

advanced joint disease), functional improvement and quality-of-life gains are realistic goals.

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10. Summary & Recommendations

- Hip pain is a multifactorial symptom that requires a systematic approach: detailed history, targeted examination, appropriate imaging/investigations, and careful interpretation of findings in context.
- Always consider the **three broad categories**: intra-articular, extra-articular, and referred/mimic pain.
- Early recognition of structural causes (e.g., FAI, labral tear, hip dysplasia) allows timely referral and can avoid progression to joint degeneration.
- Conservative management is the first line for most hip pain cases: activity modification, physical therapy, weight management, analgesics.
- Use minimally invasive interventions (guided injections, PRP) when indicated and tailor to individual patient factors.
- Surgical intervention should be based on clear diagnosis of structural pathology, failure of conservative treatment, and alignment with patient goals.
- Rehabilitation and preventive measures are essential pillars for both recovery and long-term hip health.
- Patient education: important to set realistic expectations, encourage adherence to exercise/rehabilitation, and highlight the importance of early evaluation when hip pain persists beyond expectation or impinges on function.

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PREVIOUS

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