



## Hip Dysplasia: Early Detection, Treatment Options, and Long-Term Management

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### Abstract

Hip dysplasia is a developmental disorder in which the hip joint does not properly form, leading to an abnormal relationship between the femoral head and the acetabulum. This condition can result in pain, instability, and an increased risk of osteoarthritis over time. Early detection and intervention are crucial for managing hip dysplasia and preventing long-term complications. This article provides an overview of the causes, clinical presentation, diagnostic methods, treatment options, and long-term management strategies for hip dysplasia. It emphasizes the importance of early diagnosis, the role of physical therapy, surgical interventions such as hip preservation techniques, and strategies for improving outcomes and quality of life. By reviewing current evidence and treatment approaches, this article aims to enhance understanding and improve clinical management of hip dysplasia.

**Keywords:** Hip dysplasia; Developmental hip disorder; Early detection; Hip preservation surgery; Osteoarthritis; Pediatric orthopedics

### Introduction

Hip dysplasia is a condition in which the hip joint does not develop properly [1], leading to an abnormal alignment between the femoral head and the acetabulum. This misalignment can result in hip instability, abnormal wear and tear of the cartilage, and a predisposition to early-onset osteoarthritis. Hip dysplasia is often present at birth but may not become symptomatic until later in life, often during adolescence or adulthood. The condition is more common in females, and risk factors include family history, breech presentation during childbirth, and certain genetic factors [2]. Early detection is critical to prevent complications such as joint degeneration, chronic pain, and disability. In its mildest form, hip dysplasia may be asymptomatic and detected only incidentally, while in more severe cases, patients may experience pain, limited range of motion, and a predisposition to hip dislocation. Treatment for hip dysplasia ranges from conservative approaches like physical therapy to surgical interventions aimed at reshaping the joint and improving alignment [3-5]. This article reviews the importance of early detection, treatment options, and long-term management strategies to improve outcomes for individuals with hip dysplasia.

### Materials and Methods

A systematic review of the literature was conducted using various academic and medical databases, including PubMed, Scopus, and Cochrane Library. Studies published between 2000 and 2023 were considered to ensure up-to-date information on the management of hip dysplasia [6]. The review focused on: Studies involving early detection and diagnostic methods for hip dysplasia. Treatment options, including conservative measures (e.g., physical therapy) and surgical interventions (e.g., periacetabular osteotomy, total hip arthroplasty). Long-term outcomes, including the development of osteoarthritis, pain management, and functional recovery. Risk factors and genetic predispositions for hip dysplasia. Inclusion criteria for studies were clinical trials, observational studies, and meta-analyses that provided evidence on the prevention, diagnosis, and treatment of hip dysplasia in pediatric and adult populations [7]. Studies were assessed for quality, and findings were synthesized to provide a comprehensive overview of current management strategies for hip dysplasia.

### Results and Discussion

Hip dysplasia is often congenital but can also develop during early childhood as the hip joint continues to grow. The main causes include. A family history of hip dysplasia increases the risk of developing the condition. Babies born in breech position are at higher risk for hip dysplasia [8]. External factors such as swaddling techniques or limited movement in infancy may contribute to the development of hip dysplasia. Females are more likely to develop hip dysplasia, possibly due to hormonal and anatomical differences. Early detection of hip dysplasia is essential to prevent long-term complications. Newborns and infants are typically screened through physical exams, including the Ortolani and Barlow tests, which assess the stability of the hip joint. In cases where these tests are inconclusive or if symptoms persist, ultrasound imaging is often used for infants under 6 months old to assess the joint's development. For older children and adults, X-rays are the primary diagnostic tool to assess the position and shape of the femoral head and acetabulum. More advanced imaging techniques, such as MRI or CT scans, may be used to evaluate joint damage and cartilage wear in older patients or those with more severe dysplasia.

### Treatment Options

**Physical therapy:** In mild cases of hip dysplasia, particularly in young children, physical therapy can help strengthen the muscles around the hip joint and improve stability. Exercises focus on improving joint flexibility and strengthening the hip abductors and stabilizing muscles.

**Bracing:** In infants with mild hip dysplasia, the use of a Pavlik harness or other braces can help reposition the femoral head and

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encourage proper joint development.

**Surgical interventions:** When conservative measures are ineffective, or in cases of more severe dysplasia, surgery may be necessary. Common surgical options include:

**Periacetabular osteotomy (PAO):** This surgery involves cutting and repositioning the acetabulum to better align with the femoral head [9]. PAO is most effective in patients with hip dysplasia who have not yet developed significant arthritis and is typically performed on patients under 40 years of age.

**Total hip arthroplasty (THA):** In patients with advanced arthritis and joint damage, total hip replacement may be necessary. THA is typically reserved for older patients or those with extensive cartilage loss who are experiencing chronic pain and reduced mobility.

**Post-surgical rehabilitation:** Recovery from surgery, particularly PAO, involves a structured rehabilitation program to restore hip mobility, strength, and function. Physical therapy post-surgery is crucial in regaining movement and preventing complications such as muscle weakness or joint stiffness.

**Long-term management and outcomes:** The long-term management of hip dysplasia focuses on preventing the development of osteoarthritis and maintaining joint function. Patients who undergo surgical intervention, particularly PAO, have better long-term outcomes, with many achieving a return to normal or near-normal function. However, hip dysplasia increases the risk of early-onset osteoarthritis, particularly if left untreated in childhood [10]. Regular follow-up appointments, imaging studies to monitor joint health, and an ongoing exercise regimen are important for preventing further joint degeneration and managing any symptoms. Patients with total hip replacements can benefit from ongoing physical therapy to ensure proper gait and mobility.

## Conclusion

Hip dysplasia is a condition that can lead to significant complications if left untreated. Early diagnosis is key to preventing severe joint damage and improving long-term outcomes. Conservative treatments such as physical therapy and bracing can be effective for mild cases, particularly in infants. However, more severe cases often require surgical interventions like periacetabular osteotomy or total hip arthroplasty to prevent or manage joint degeneration. A

multidisciplinary approach, including orthopedic surgeons, physical therapists, and rehabilitation specialists, is essential for optimal management. With early intervention and appropriate treatment, individuals with hip dysplasia can lead active lives and avoid the debilitating effects of arthritis and chronic pain. The future of hip dysplasia management lies in continued research into early detection methods, improved surgical techniques, and rehabilitation strategies that can further enhance the quality of life for affected individuals.

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## Interest of Conflict

None

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