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# Revision Total Hip Arthroplasty for Recurrent Dislocation in a Young Adult: A Case Report

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***Abstract***

***Introduction:*** *Total hip arthroplasty (THA) is the treatment of choice for advanced hip osteoarthritis, including cases secondary to developmental disorders. Despite generally favourable outcomes, recurrent prosthetic dislocation remains a challenging complication, particularly in young and physically active adults. In younger patients, implant selection options are limited and long-term durability is a major concern, rendering future revision surgeries more complex.*

***Case Presentation:*** *A 34-year-old woman who had undergone right THA for osteoarthritis secondary to slipped capital femoral epiphysis presented with sudden severe pain and functional limitation five years after surgery, without recent trauma. Plain radiography and computed tomography revealed no abnormalities, while bone scintigraphy demonstrated marked periprosthetic metabolic activity surrounding the femoral stem of the right hip prosthesis (Figure 1). Laboratory markers showed no evidence of infection.*

***Therapeutic Intervention and Outcome:*** *After excluding prosthetic joint infection, revision surgery was performed with replacement of the femoral head by a larger-diameter component to enhance joint stability. Intraoperative cultures and histological examination were negative. The patient underwent a structured rehabilitation programme, progressively recovered function, and returned to work after three months.*

***Discussion and Clinical Relevance:*** *This case highlights the limitations of static imaging modalities in the assessment of dynamic instability and underscores the importance of individualized clinical evaluation, careful implant selection, and efficient resource management. Delay in surgical intervention resulted in occupational and indirect economic impact.*

***Conclusion:*** *Targeted revision surgery, structured rehabilitation, and rational use of healthcare resources may lead to favourable functional outcomes. Case reports remain essential for sharing clinical experience in complex scenarios.*

**Keywords:** Total Hip Arthroplasty, Recurrent Dislocation, Revision Surgery, Young Adult, Case Report.

## Introduction

Total hip arthroplasty (THA) represents the definitive treatment for end-stage hip osteoarthritis, including secondary forms related to developmental disorders such as slipped capital femoral epiphysis and developmental dysplasia of the hip. It is one of the most successful procedures in modern orthopaedics, providing significant pain relief, functional improvement, and enhanced quality of life [1].

Although traditionally reserved for elderly patients, there has been a progressive increase in the use of THA in younger adults over recent decades, particularly in cases of secondary osteoarthritis. In this population, THA is often considered a last-resort therapeutic option, as longer life expectancy and higher levels of physical activity impose increased mechanical demands on prosthetic components and a higher cumulative risk of complications and revision surgeries throughout life.

Implant selection and surgical technique in young adults are particularly challenging and should prioritise bone stock preservation and maximisation of joint stability. Each revision surgery is associated with greater technical complexity, increased risk of complications, and progressive limitation of future therapeutic options, highlighting the importance of meticulous initial planning [2-4].

Prosthetic instability remains one of the most frequent complications following THA and is a leading indication for revision surgery. Recurrent dislocation poses a significant clinical challenge, negatively affecting quality of life, functional autonomy, and psychological well-being. In young and professionally active individuals, these consequences are particularly relevant and may result in prolonged work incapacity and substantial socioeconomic impact.

The diagnosis of prosthetic instability can be complex, especially when the mechanism is dynamic. Conventional imaging studies performed in static positions may fail to reveal relevant structural abnormalities despite pronounced clinical symptoms, making thorough clinical assessment, longitudinal follow-up, and judicious use of complementary diagnostic tests essential [6-8].

Case reports continue to play a relevant role in the scientific literature by enabling the description of uncommon clinical presentations, identification of diagnostic limitations, and discussion of individualized therapeutic strategies in settings with limited evidence. This report describes a case of recurrent prosthetic instability following THA in a young adult, highlighting diagnostic challenges, therapeutic decision-making, and associated clinical and organisational implications.

## Case Presentation

A 34-year-old woman presented to the emergency department with sudden onset of severe right hip pain, abrupt in nature, without any identifiable traumatic event. The pain was described as deep, continuous, and disabling, with a maximum intensity of 9/10 on the numerical pain scale, exacerbated by movement and weight-bearing on the right lower limb. She reported a subjective sensation of joint instability and episodes of mechanical acetabular snapping, particularly during the transition from sitting to standing [9].

On initial examination, the patient exhibited marked functional impairment, with significant difficulty walking, need for assistance with mobilization, and substantial limitation in activities of daily living, including dressing, footwear, and stair climbing. This impairment had an immediate impact on her personal autonomy and work capacity [10].

Relevant medical history included right-sided slipped capital femoral epiphysis in childhood, surgically treated, with subsequent progression to secondary hip osteoarthritis. In 2015, at 29 years of age, she underwent right THA due to worsening pain and functional limitation refractory to conservative measures. The surgical procedure was uneventful, and early postoperative recovery was favourable, allowing return to work and maintenance of an active lifestyle for approximately five years.

Her medical history also included papillary thyroid carcinoma with follicular pattern, previously treated surgically and under surveillance, with no evidence of active disease. She had no other relevant comorbidities, including diabetes mellitus, was a non-smoker, was not receiving immunosuppressive therapy or chronic corticosteroids, and had no history of joint infections or additional surgeries on the right hip [11].

In July 2020, following a prolonged work shift involving approximately 12 consecutive hours of standing, she developed sudden right hip pain accompanied by gait difficulty. She denied falls, direct trauma, sudden movements, or exceptional physical exertion. She also denied fever, chills, night sweats, local inflammatory signs, or discharge from the surgical scar.

Physical examination revealed significant pain on active and passive mobilisation of the right hip, with marked limitation of range of motion, particularly in flexion and internal rotation. Gait was antalgic and limited by fear of instability. There were no local skin changes, inflammatory signs, swelling, or associated neurovascular deficits.

### Diagnostic Assessment

The primary objective of the initial diagnostic approach was to exclude the most common causes of late-onset pain following THA, namely prosthetic joint infection, component loosening, periprosthetic fracture, or dislocation [12].

Laboratory evaluation included complete blood count, C-reactive protein (CRP), and erythrocyte sedimentation rate (ESR), all of which were within normal limits. The absence of leukocytosis and persistently normal inflammatory markers made acute or chronic prosthetic joint infection unlikely, a hypothesis further supported by the lack of suggestive clinical signs, although these findings alone could not definitively exclude infection.

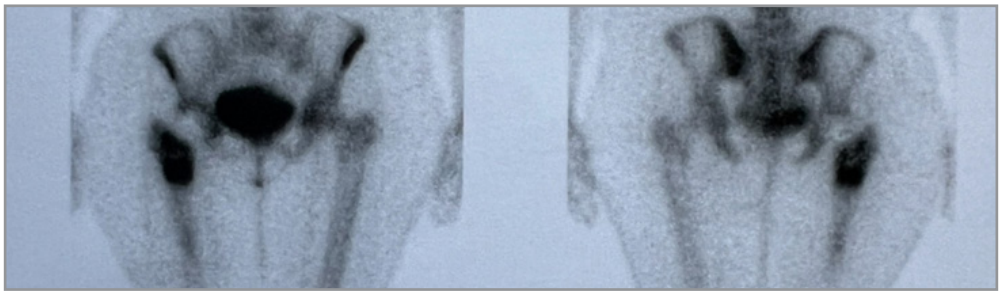
Initial imaging assessment included standard anteroposterior pelvic and right hip radiographs, which showed no evidence of prosthetic dislocation, periprosthetic fracture, or radiographic signs of component loosening. Apparent positioning of both the acetabular and femoral components was within accepted parameters.

Given the persistence of symptoms and the discrepancy between pronounced clinical findings and unremarkable radiographs, computed tomography was performed to assess component alignment and positioning in greater detail and to exclude subtle osseous abnormalities. This examination revealed no significant malalignment, relevant osteolysis, or signs of mechanical failure. Additionally, magnetic resonance imaging was performed; despite limitations related to metallic artefacts, it did not demonstrate fluid collections, significant periarticular soft tissue abnormalities, major muscle tears, or features suggestive of deep infection [13].

Due to persistent disabling symptoms and the absence of abnormalities on static imaging, a three-phase bone scintigraphy was requested. This revealed intense periprosthetic metabolic activity surrounding the femoral stem of the right hip prosthesis, more pronounced proximally (Figure 1). This pattern was interpreted as consistent with an active inflammatory process. Although this

finding could raise suspicion of infection, the lack of clinical and laboratory correlation supported the interpretation of dynamic prosthetic instability.

These findings highlight the limitations of static diagnostic modalities in detecting dynamic mechanical phenomena and emphasise the importance of careful integration of clinical, laboratory, and imaging data in the diagnosis of prosthetic instability following THA.



Anterior view Posterior view

**Figure 1:** Three-phase bone scintigraphy demonstrating intense periprosthetic metabolic uptake involving the femoral stem of the right hip prosthesis.

**Therapeutic Intervention**

In view of persistent severe pain, marked functional impairment, and significant negative impact on quality of life and work capacity, a multidisciplinary discussion involving orthopaedics, nuclear medicine, and general and family medicine was conducted. After careful exclusion of alternative diagnoses, particularly prosthetic joint infection, dynamic prosthetic instability was considered the most plausible explanation for the clinical presentation [14].

Infection was excluded based on the absence of suggestive clinical signs, persistently normal inflammatory markers, and lack of imaging findings compatible with chronic infection. Although bone scintigraphy demonstrated intense periprosthetic uptake, this finding was interpreted within the overall clinical context as consistent with a mechanically driven inflammatory process rather than active infection.

Considering the patient's young age, the need to preserve bone stock, and the aim of minimising surgical aggressiveness, a limited revision procedure was chosen. Surgery was performed through a posterior approach using the previous surgical scar to reduce morbidity associated with reoperation and soft tissue disruption.

Intraoperatively, there were no macroscopic signs of infection, loosening of the acetabular or femoral components, or significant prosthetic wear. Dynamic intraoperative assessment revealed instability consistent with the clinical findings. Multiple periprosthetic tissue samples were obtained for microbiological cultures, and frozen-section histology was performed; both were negative for infection or significant inflammatory reaction.

The femoral head was replaced with a larger-diameter component to optimise joint stability and reduce the risk of recurrent dislocation, while retaining the remaining components in situ. This approach preserved existing bone structures, reduced operative time, minimised the risk of complications associated with more extensive revisions, and limited procedural costs.

**Postoperative Rehabilitation and Outcome**

The immediate postoperative course was uneventful. The patient reported significant pain relief from the first postoperative days, although she experienced initial functional apprehension and required relearning of movements, reflecting the physical and psychological impact of prolonged preoperative instability.

A structured rehabilitation programme was implemented, consisting of supervised physiotherapy three times per week for approximately three months. The programme focused on progressive mobilisation, strengthening of hip stabilising muscle groups, balance training, postural control, and joint protection education. Clinical progress was gradually favourable, with improvement in range of motion, restoration of gait confidence, and increased functional autonomy.

The patient returned to work approximately three months after surgery and remained asymptomatic, with no further episodes of instability at last follow-up. Functional outcome was considered satisfactory, with recovery of the ability to perform activities of daily living and professional duties.

It is important to note that delay in definitive diagnosis and surgical decision-making resulted in a prolonged period of functional and occupational disability prior to intervention. This had a significant impact on the patient's personal and professional life and translated into a substantial indirect economic loss to society, often overlooked in formal health cost analyses, particularly due to irreversible loss of productive time.

## Discussion

Prosthetic instability following total hip arthroplasty (THA) remains one of the most frequent and challenging complications in orthopaedic practice and accounts for a significant proportion of revision surgeries. Despite advances in implant design, materials, and surgical techniques, this complication continues to represent a relevant clinical problem, particularly in specific populations such as young adults.

In this age group, THA is generally regarded as a last-resort therapeutic option. Longer life expectancy, higher physical activity levels, and increased functional demands translate into a higher cumulative risk of implant wear, instability, and failure over time. Furthermore, the limited longevity of prostheses implies

a high likelihood of future revision surgeries, each associated with greater technical complexity, increased complication risk, and progressive bone stock loss. These factors significantly constrain future therapeutic options and underscore the need for a cautious, individualised, and conservative approach whenever clinically appropriate.

The present case clearly illustrates these challenges. A young, professionally active patient presented with a pronounced clinical picture characterised by sudden severe pain, mechanical catching, and marked functional impairment, strongly suggestive of prosthetic instability. However, conventional imaging studies—radiography, computed tomography, and magnetic resonance imaging—did not demonstrate dislocation, loosening, or overt mechanical failure. This discrepancy between clinical findings and static imaging is a well-recognised diagnostic pitfall and may lead to significant delays in diagnosis and treatment.

Dynamic prosthetic instability is particularly challenging to diagnose, as commonly used imaging modalities are performed under static conditions and may not reproduce symptom-provoking mechanisms. In such contexts, clinical assessment plays a central role, requiring detailed history-taking, careful evaluation of pain and instability patterns, and often repeated assessments over time. Overreliance on complementary diagnostic tests at the expense of clinical judgement may delay decision-making and unnecessarily prolong patient suffering.

Three-phase bone scintigraphy played a relevant complementary role in this case by providing functional information that, when integrated with clinical and laboratory data, supported the hypothesis of mechanical instability. The intense periprosthetic metabolic uptake observed around the femoral stem reflected an active mechanically driven inflammatory process. It should be emphasised that this modality is nonspecific and cannot reliably distinguish septic from aseptic processes in isolation. However, when interpreted in context, it may be useful in diagnostically uncertain scenarios.

Another key aspect was the rigorous exclusion of prosthetic joint infection. The term "prosthesis rejection," often incorrectly used in clinical practice, most commonly refers to periprosthetic infection. Distinguishing infection from mechanical causes of pain is crucial, as therapeutic strategies differ substantially. The absence of suggestive clinical signs, persistently normal inflammatory markers, and negative intraoperative cultures and histology allowed safe exclusion of infection. This was decisive in avoiding more aggressive interventions, such as two-stage revision procedures, which are associated with higher morbidity, increased costs, and significant functional impact.

The decision to perform a limited revision surgery, replacing only the femoral head with a larger-diameter component, proved appropriate in this context. This strategy improved joint stability and reduced the risk of recurrent dislocation while preserving existing components and bone stock. In young patients, such conservative approaches are particularly valuable, as they minimise surgical aggressiveness and preserve future treatment options.

Beyond clinical and technical considerations, this case highlights important organisational and socioeconomic implications related to delayed diagnosis and treatment. The patient experienced several months of severe pain and functional impairment, resulting in prolonged work absence. This occupational loss represents a significant indirect economic burden for society, often underestimated or excluded from formal healthcare cost analyses, yet particularly relevant in young working-age individuals.

Delays in diagnostic testing, clarification of pain aetiology, and surgical decision-making contributed to prolonged disability. This underscores the importance of efficient healthcare resource management, grounded in careful clinical assessment and rational selection of diagnostic tests. Sequential performance of multiple investigations without a clear diagnostic hypothesis may lead to increased costs, unnecessary delays, and patient frustration without proportional clinical benefit.

In an era of increasing pressure on healthcare systems, integrating economic considerations into clinical decision-making is increasingly important. Resource optimisation should not be perceived as compromising quality of care but rather as an essential component of responsible and sustainable clinical practice. Early identification of conditions amenable to effective surgical intervention may reduce prolonged disability, minimise indirect costs, and improve overall health outcomes.

This case also reinforces the importance of coordination between primary and secondary care. Longitudinal follow-up, early recognition of symptoms, and effective communication across care levels are critical to a patient-centred approach. General and Family Medicine plays a key role in functional monitoring, management of work incapacity, and coordination of care, contributing to integrated and efficient healthcare delivery.

Finally, this report highlights the ongoing value of case reports in contemporary clinical practice. In complex or uncommon scenarios, such as dynamic prosthetic instability in young adults, high-level evidence is limited. Structured sharing of clinical experiences enables identification of diagnostic pitfalls, discussion of therapeutic strategies, and generation of hypotheses for future research, contributing to continuous improvement in medical practice and resource management.

## Conclusion

Recurrent dislocation following total hip arthroplasty in young adults represents a significant clinical and therapeutic challenge, with implications extending beyond orthopaedics. Dynamic prosthetic instability may present with pronounced symptoms in the absence of evident structural abnormalities on conventional imaging, requiring a high index of clinical suspicion and an integrated diagnostic approach.

This case illustrates the limitations of static imaging modalities in evaluating dynamic mechanical phenomena and reinforces the importance of prioritising clinical assessment, symptom evolution, and patient functionality. Judicious use of functional imaging studies, such as bone scintigraphy, may provide additional relevant information when interpreted within the broader clinical context, avoiding decisions based solely on isolated imaging findings.

In young patients, THA should be regarded as a last-resort intervention due to limited implant longevity and the high likelihood of revision surgeries over a lifetime. Each additional procedure entails increased technical complexity, higher complication risk, and progressive reduction of future reconstructive options. In this context, conservative surgical strategies, when clinically appropriate, are particularly valuable. The limited revision performed in this case, involving replacement of the femoral head only, restored joint stability, preserved bone stock, and achieved a favourable functional outcome. This report also underscores the importance of rigorously excluding prosthetic joint infection, often inaccurately referred to as "prosthesis rejection." Differentiating mechanical from infectious causes of post-arthroplasty pain is essential, as management strategies differ substantially and directly affect morbidity, costs, and patient quality of life.

Beyond clinical implications, this case highlights the socioeconomic impact associated with delayed diagnosis and treatment, particularly in young and professionally active patients. Prolonged functional impairment and work absence generate significant indirect societal costs, frequently overlooked in healthcare systems. Timely clinical evaluation combined with rational management of diagnostic and therapeutic resources may reduce these costs and improve overall health outcomes.

Finally, this work reinforces the value of case reports in contemporary medical practice. In complex or infrequent scenarios, structured sharing of clinical experiences helps identify diagnostic pitfalls, reflect on individualised therapeutic strategies, and contribute to continuous improvement in patient-centred and sustainable healthcare.

## Declarations

Ethical approval and informed consent: Written informed consent was obtained from the patient for publication of this case report and associated clinical information.

## Conflicts of Interest

The author declares no conflicts of interest.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## Authors' Contributions

The author was responsible for study conception, data collection and interpretation, manuscript drafting, and approval of the final version.


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