

CASE REPORT

Leg Length Discrepancy in a Patient with Ipsilateral Total Knee and Total Hip Arthroplasty

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ABSTRACT

Leg length discrepancy (LLD) is the most frequent complication following elective total hip arthroplasty. Although several intraoperative imaging and clinical techniques have been proposed to minimize this complication, their effectiveness remains unsatisfactory. Furthermore, there is no consensus among arthroplasty surgeons on how to address this issue. In this case report we present an unusual LLD case following primary total hip arthroplasty which highlights the complexity of this clinical problem.

Level of Evidence: V; Case report.

Keywords: Leg length discrepancy; Total hip arthroplasty complications.

INTRODUCTION

Despite concerted intraoperative attempts to establish equal limb alignment, leg length discrepancy (LLD) remains a frequent complication following elective total hip arthroplasty (THA) [1]. A number of effective intraoperative imaging and clinical limb length techniques have been recommended to minimize this complication; however, all of these assessment modalities have their reported limitations [2,3]. Moreover, the multifactorial nature of the issue of equal leg length has impeded the development of a consensus among hip arthroplasty surgeons on how to best avoid LLD.

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We report an unusual case which exemplifies the complexity of this problem in an adult male with ipsilateral total knee arthroplasty (TKA) who experienced LLD following primary THA despite the utilization of recommended imaging and clinical techniques to circumvent this problem.

CASE REPORT

In July 2011, a 59-year-old male presented with severe left hip pain that had progressively increased for approximately 1 year and did not respond to activity modification, cane-assisted ambulation, or nonsteroidal anti-inflammatory medication. His past medical history was unremarkable for an uneventful left TKA 4 years prior, secondary to osteoarthritis (Figure 1). The patient's functional history included an inability to perform activities of daily living (prolonged

standing, walking, or climbing stairs) and his pain persisted during bed rest at night. Physical examination noted decreased active and passive left hip joint motion and severe pain with passive left hip flexion and internal rotation, or resisted left straight leg raise. His leg lengths were symmetric and

his gait pattern was normal; however, ambulation was associated with pronounced left groin and greater trochanter pain. Left hip X-rays demonstrated marked degeneration with diffuse joint-space narrowing and anterosuperior acetabulum subchondral sclerosis (Figure 2).

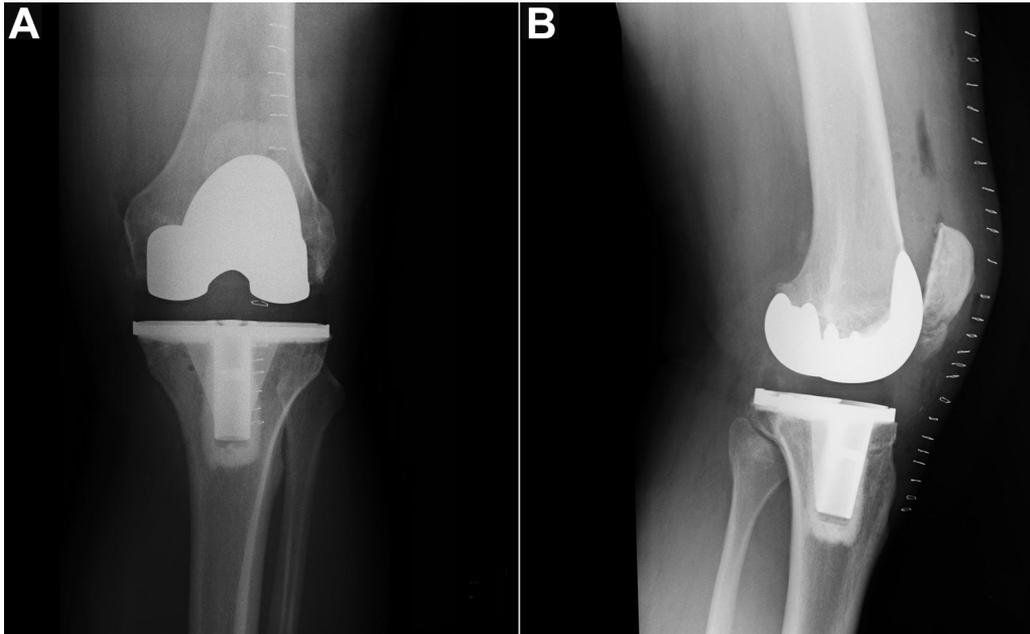


Figure 1. Anteroposterior (A) and lateral (B) plain radiographs depicting patient's total knee arthroplasty performed 4 years prior to presentation with symptomatic ipsilateral hip osteoarthritis.

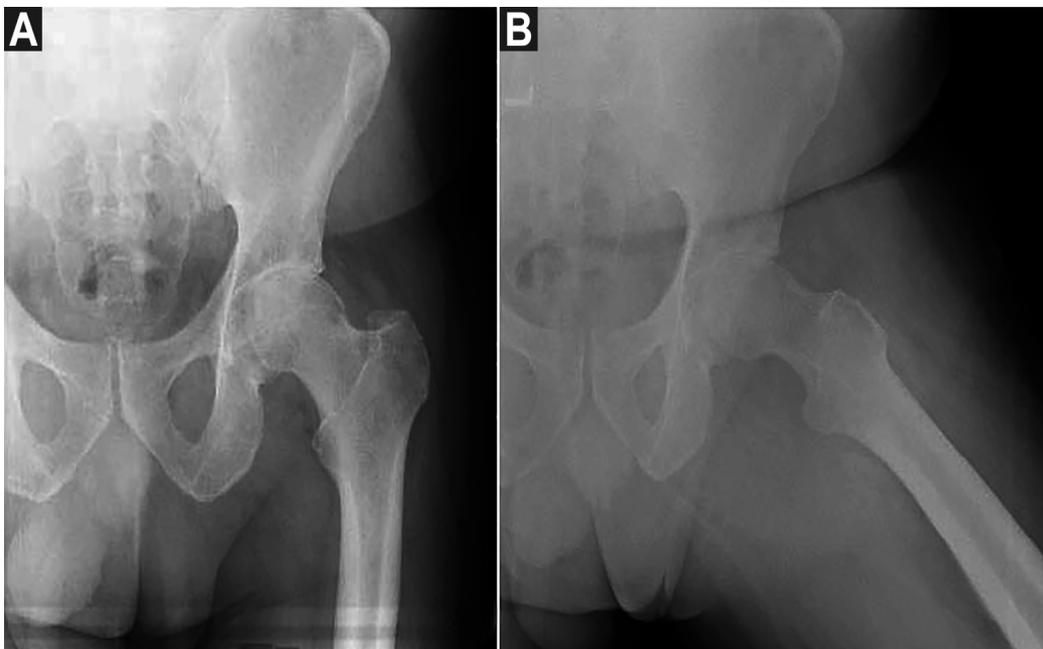


Figure 2. Plain radiography demonstrating osteoarthritis in the ipsilateral hip joint.

On July 20, 2011 the patient underwent uneventful left total hip arthroplasty through a posterior Kocher-Langenbeck approach, and limb length was established on intraoperative anteroposterior pelvis X-rays by aligning the left lesser trochanter with its right counterpart in accordance to a line extending along the tip of the ischial tuberosities. The leg length established by imaging was also corroborated intraoperatively by the clinical comparison of bilateral femur length with both knees flexed to approximately 60 degrees. Initial postoperative anterolateral pelvis

and bilateral hip radiographs 2 weeks postoperatively also confirmed the adequate radiographic length of the patient's left total hip arthroplasty (Figure 3). Clinically, however, the patient felt that his left leg was longer than the right postoperatively, and subsequent clinical evaluation documented a 3/4-inch leg length discrepancy (left longer than right). Although his preoperative symptoms completely resolved, and the patient quickly returned to a full and unrestricted lifestyle, the LLD was a persistent complaint. The patient was eventually fitted with a 5/8-inch shoe lift to address the LLD.

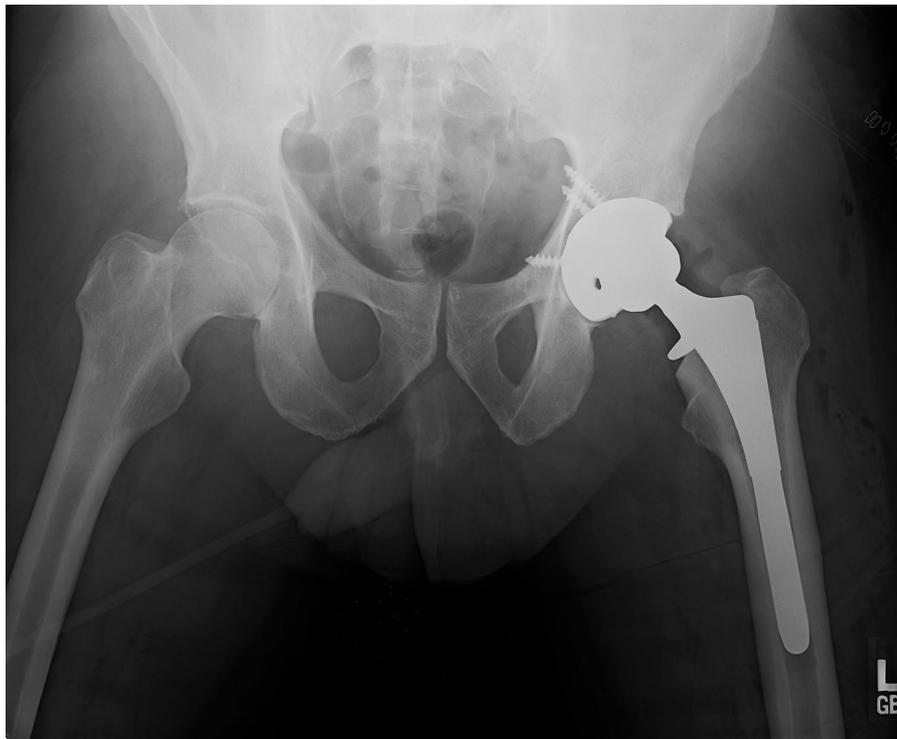


Figure 3. Bilateral hip plain radiography demonstrating left total hip replacement for osteoarthritis.

DISCUSSION

LLD is the most prevalent complication associated with total hip arthroplasty [1]. LLD, either actual or perceived, has been associated with poor patient functional outcomes and negatively impacts patient satisfaction [1,4]. Although current THA limb length

assessment methods frequently employ pre- and intraoperative pelvic radiographs to achieve lower limb length symmetry, no consensus exists in the literature as to how this goal can be reliably accomplished [2,4]. Meermans et al. evaluated the dependability and accuracy of 4 common limb measurement methods reported in 24 studies [2].

When pelvic radiographs were used, they determined that the interteardrop line is more reliable than the bi-ischial line and, in conjunction with the center of the femoral head, should be the preferred pelvis radiographic reference technique.

Also included among the other radiographic leg length measurement methods that have been recommended are full leg standing anteroposterior (AP) radiographs, intraoperative AP pelvis radiographs, reference pins placed intraoperatively for length measurement, and comparison of the dimensions of resected bone with the dimensions replaced by the prosthesis [2,3]. Another intraoperative clinical limb assessment technique consists of comparing bilateral femur lengths through the sterile drapes with the hips in symmetric degree of flexion. Interestingly, none of these methods, radiographic or clinical, would account for the potential impact of prior lower extremity length abnormalities or surgical interventions. In addition, all of the currently advocated objective THA limb length assessment methods fail to consider the patient's subjective perception of preoperative leg length symmetry [1].

Our case demonstrates many of the challenges associated with achieving leg length symmetry during THA. Although utilizing existing objective measurement modalities has clear merit, these methods may have significant limitations even when properly executed. A comprehensive past medical history and physical examination are imperative to establish the presence of pre-existing disease, surgery, injury, and/or congenital abnormalities in both the affected and contralateral extremity. A comprehensive assessment of limb lengths prior to hip surgery should also include the patient's subjective perception of their leg symme-

try. Finally, even the presence of normal preoperative leg lengths, either actual or perceived, does not assure that the proper application of any of the current objective THA limb length measures will guarantee postoperative leg length symmetry.

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