

# Concurrent one-stage total knee and hip arthroplasty due to sequel of juvenile rheumatoid arthritis

## A case report

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### Abstract

**Rationale:** Rheumatoid arthritis is a chronic systemic connective tissue disease. Total hip and knee arthroplasties are common major orthopaedic procedures worldwide.

**Patient concerns:** To date, no studies have presented 1-stage concurrent total hip arthroplasty (THA) and total knee arthroplasty (TKA) in patients with rheumatoid arthritis (RA). We reported a case which is, to our knowledge, the first description of both THA and TKA in a patient with RA simultaneously.

**Diagnoses:** History of juvenile rheumatoid arthritis (JRA), deterioration of signs and symptoms in history and physical examinations and radiography were lead to making decision for her surgery.

**Interventions:** Concurrent total hip replacement and total knee arthroplasty were performed for patient.

**Outcomes:** After more than a 2-year follow-up time, the patient showed excellent clinical function and remained satisfied with the surgical outcome. Multiple simultaneous total joint arthroplasty (TJA) is reviewed in this article.

**Lessons:** Joint arthroplasty surgeries can be performed in a simultaneous procedure to shorten disability and rehabilitation time with one anesthesia.

**Abbreviations:** JRA = juvenile rheumatoid arthritis, RA = rheumatoid arthritis, THA = total hip arthroplasty, TJA = total joint arthroplasty, TKA = total knee arthroplasty.

**Keywords:** one-stage procedure, rheumatoid arthritis (RA), total hip arthroplasty (THA), total knee arthroplasty (TKA)

## 1. Introduction

Rheumatoid arthritis (RA) is a chronic systemic connective tissue disease, and it is the third most common indication for lower limb joint replacement in Northern Europe and North America. The prognosis is poor, with 80% of patients being disabled 20 years from primary diagnosis.<sup>[1]</sup> The medical treatment of RA has

improved during the last 25 years, which is reflected by a 40% decrease in the rate of hip and knee surgery since a peak that was observed in the mid-1990s.<sup>[2]</sup> Over the past 30 years, major advances have been realized in the understanding of the pathogenesis and treatment of RA. Joint contractures, fixed flexion and valgus deformities, and ligamentous laxity are especially evident in large joints, complicating treatments. Advance in highly effective biologic therapies leads to fewer individuals with rheumatoid arthritis suffering end-stage joint destruction.<sup>[1,3]</sup> Although there are many successes in its treatment nearly 20% to 25% of cases develop advanced arthritis in their joints that can result in patient pain and overall disability.<sup>[4,5]</sup> Total hip and knee arthroplasties are common major orthopedic procedures worldwide.<sup>[6]</sup> Total hip arthroplasty (THA) is the main treatment option for restoring function and mobility for various end-stage degenerative conditions of the hip cartilage.<sup>[7-9]</sup> In advanced knee RA disease, when synovectomy has no benefit, total knee arthroplasty (TKA) has proven to be the most successful intervention that reduces knee pain and improves physical function in RA patients.<sup>[10,11]</sup>

To date, no studies have presented simultaneous 1-stage THA and TKA in patients with RA. We reported a case that is, to our knowledge, the first description of both THA and TKA in a patient with RA. After more than a 2-year follow-up time, the patient showed excellent clinical function and remained satisfied with the surgical outcome.

## 2. Case report

A 34-year-old female with a history of juvenile rheumatoid arthritis (JRA) from January 2003 underwent treatment with

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Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

AT participated in the design of the study and performed the surgeries. AS conceived the study, participated in its design and helped to draft the manuscript. All the authors read and approved the final manuscript.

The authors have no conflicts of interest to disclose.

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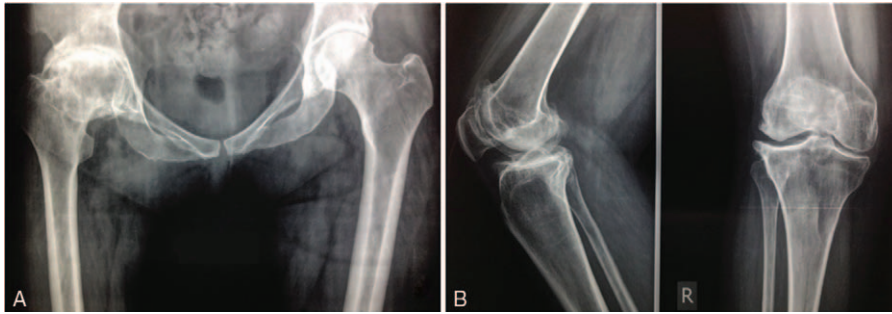
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**Figure 1.** Plain radiographs of the right hip (A) and knee (B). Erosion and severe destruction of hip joint and extinct joint space in hip and erosive changes in knee can be seen here.

Methotrexate and Prednisolone. Her JRA was controlled and subsided from 3 years ago. She had a history of severe obsessive and compulsive disorder. She could not previously walk during these 3 years and she walked with help or walker.

In December 2012 she referred to clinic. She reported a 6-month history of progressive severe right hip pain that had worsened with ambulating and bearing weight on her right lower extremity. Her pain was progressed in rest during these 6 months. There was no history of fever and chills, weight loss, infection symptoms. At 4 months, also, she began to develop medial and lateral and deep right knee pain, without associated knee swelling, warmth, or wound disturbance or trauma. Her symptoms steadily worsened, particularly with load-bearing activity and flexion past 70°.

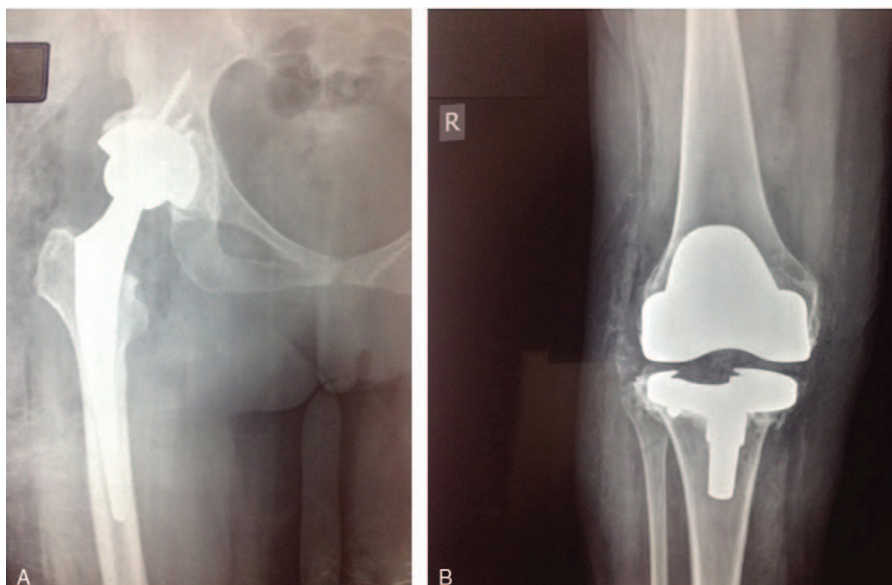
She had medial-sided tenderness and a moderate knee effusion without erythema or warmth upon examination. She had a flexion contracture of 35° in examination. The knee was stable in flexion and extension with an active range of motion of 0° to 70°. Passive range of motion was 0° to 95°. These lead to limiting her knee motion. Motion was limited by medial and posterior pain. Other lower limb examination was normal. Also in her right hip examination we detected a tender soft tissue mass with significant

edema of the proximal thigh. Limitation in range of motion of right hip was seen with discomfort at the extremes of motion.

Plain radiographs of the right hip and knee showed erosion and severe destructive hip joint, extinct joint space, and erosive changes and nonspecific change in knee (Fig. 1). Blood inflammatory markers were all within the normal limits. Arthrocentesis of the right knee showed bloody aspiration, and revealed no growth with cultures. She was then considered to be a candidate for total knee and hip arthroplasty.

Total hip replacement was performed with direct lateral Hardinge approach and cementless Continium cup (Zimmer, Warsaw, IN) implanted with M/L taper Hip Prosthesis (Zimmer, Warsaw, IN) (Fig. 2A). Thereafter, at the same time position changed and anterior midline incision was done then debridement was performed and total knee arthroplasty did without tourniquet. We used hypermobile knee prosthesis (Link, Hamburg, Germany) (Fig. 2B). We did not use any drain and use intra-articular Tranexamic acid. There was no effusion present or evidence of synovitis, and there was no significant capsular scarring/contracture. Specimen for culture was sent and was negative.

She was ambulated the day after the operation. She was discharged from the hospital healthy and had no problem. There



**Figure 2.** Right total hip arthroplasty (A). Right total knee arthroplasty (B).

were no surface infection signs and radiological findings after operation follow-ups. The patient made an uneventful recovery and had a full resolution of her preoperative symptoms within 6 weeks. We evaluated the patient for 2 years in serial examination and radiological examination. During this time, she remains clinically well, mobile, and had a painless range of knee motion from 0° to 140° and range of hip motion from 0° to 130°. She was mobilizing full weight bearing. There was no radiological evidence of implant loosening and also dislocation was not seen in this period of follow-up.

### 3. Discussion

Rheumatoid arthritis is a systemic disease, which creates a unique set of challenges and considerations when treating patients afflicted with this disease. In 80% of the cases, RA develops between the ages of 35 and 50 years.<sup>[12,13]</sup> Total joint arthroplasty (TJA) is considered one of the most successful health-care interventions for end-stage arthritis of the hip or knee.<sup>[14-16]</sup> Outcomes following THA and TKA are generally excellent, with low complication rates. However, some complications have significant consequences, including early revision, infection or dislocation, venous thromboembolism, and death.<sup>[17,18]</sup> This special case showed that simultaneous THA and TKA as a duplicated procedure reduced disability without major complications. There are several articles and case reports of presenting patients who underwent 1-stage bilateral THA and TKA.<sup>[19-22]</sup> However, to our knowledge 1-stage THA and TKA together have been reported rarely.

Simultaneous TJA has been shown to be associated with higher complication rates than staged bilateral or unilateral TJA.<sup>[23]</sup> However, reduction in costs and rehabilitation time and improvement of surgical technique with critical patient selection has led to significant reduction of complications and further recommendation of the simultaneous procedure. Simultaneous TJA of 2 joints versus staged TJA during different anesthesia have been studied extensively. Two TJA during 1 anesthesia was found to offer a multitude of advantages including patient convenience, shorter disability and recovery periods, and reduced costs for patients and institutions.<sup>[24,25]</sup> Our case report supports these findings. Currently, knee flexion can be expected to be on average between 110° and 125° with excellent results in 70% of cases.<sup>[23,26]</sup> Our patient was able to flex to 140° in her knee that underwent the surgery.

Xie et al reported a case of a 59-year-old female with osteopetrosis with hip pain and bilateral, right greater-than-left, knee pain with activity limitation for 13 years. She underwent THA in the left hip first and after 6 months later, TKA was performed of her right knee. They reported no complications during 1-year follow-up.<sup>[27]</sup> In contrast to us their case underwent both TKA and THA in staged procedure and they did not perform the procedure at the same time. In another study, Pagenstert and Hintermann<sup>[28]</sup> presented a patient with simultaneous bilateral valgus and patellofemoral osteoarthritis (OA) of the knees and bilateral varus OA of the ankle joints that equally contributed to overall disability. Their case motivated and otherwise healthy patient was treated by simultaneous bilateral total knee and ankle arthroplasty (quadruple TJA) during the same anesthesia and 2 years' outcome showed excellent alignment and function of all 4 replaced joints. Postoperative time for rehabilitation, back to work (6th week) and hospital stay (12 days) of this special patient was markedly reduced compared with the usual course of separate TJA.<sup>[28]</sup> Their case report

similar to our case showed that multiple TJA can be performed and have lesser complications. However, they performed 2 lesser joint and 2 major joints. Head and Paradies<sup>[29]</sup> in a similar study performed a total of 13 surgical procedures on 8 patients, all of whom had a history of rheumatoid arthritis. Five patients had bilateral hip and knee replacements and 3 patients had ipsilateral hip and knee replacements for a total of 26 joint replacements. They showed that ambulatory status for all the placements was significantly improved and all the patients subjectively reported a great reduction in pain postoperatively. They also reported complications that included 2 transient peroneal-nerve palsies in the same patient from which she recovered spontaneously, and 1 questionable pulmonary embolus that resolved with heparin therapy.<sup>[29]</sup> Although our special case report is not reporting for the first time, but because of its rarity we report this case.

The recommended sequence during multiple TJA at the same limb was proposed to implant "from proximal to distal" to control alignment.<sup>[29]</sup> So, we performed this sequence and got the best outcome in our special case. Multiple TJA staged to ipsilateral simultaneous total hip and knee with a short interval of both sides have been recommended.<sup>[29]</sup> This can be because of short enough time to prevent limited rehabilitation capacity and consecutive adhesions caused by the neglected arthritic joints. Based on these findings it seems to be critical to treat all disabled major joints of 1 patient within a short time interval to increase functional overall outcome but control fatal medical complications.

### 4. Conclusion

In the presence of involvement of the knee and hip contributing equally to cumulative gait inability in the same patient, surgical treatment of both the joints may be indicated. Surgery can be accomplished in a staged fashion or as a simultaneous procedure under 1 anesthesia to shorten disability and rehabilitation time that would accumulate with sequential TJA. We showed that simultaneous TKA and THA with 1-stage anesthesia decreases total time spent in hospital, is cheaper and the patient achieves better functional results. In our study, simultaneous THA and TKA appears to carry a lower postoperative morbidity. It appears this procedure would be safer medically to have procedures separated by a period of time in RA patients. We would recommend that fit candidates with degenerative both knee and hip arthritis undergo concurrent THA and TKA, with its proven good functional results, better rehabilitation, and possible cost savings.

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