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## Management of knee rheumatoid arthritis and tibia nonunion with one-stage total knee arthroplasty and intramedullary nailing: A report of two cases

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### ABSTRACT

Total knee arthroplasty (TKA) is a surgical procedure which is widely used in the treatment of gonarthrosis secondary to rheumatoid arthritis (RA). The incidence of stress fractures in tibia in the patients with RA is higher compared to normal patients. In this study, we report two cases of TKA and intramedullary nailing in RA patients with severe knee arthritis and tibial nonunion. Both patients had a satisfactory clinical outcome with radiological healing of the tibial fracture.

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### Introduction

Rheumatoid arthritis (RA) is an autoimmune disease characterized by synovial joint destruction.<sup>1,2</sup> Knee involvement is common in patients with RA.<sup>3,4</sup> Total knee arthroplasty (TKA) is a widely used surgical treatment method for patients with knee RA.<sup>5</sup> However, osteopenia is a challenging problem in RA and impacts the success rate of TKA procedures. Furthermore, progressive joint destruction leads to flexion contracture of the knee joint, which can cause technical difficulties when performing TKA in RA.<sup>6,7</sup> The RA patients have a higher risk of infection.<sup>8,9</sup> Patients with RA who undergo TKA are at increased risk of prosthetic joint infection.<sup>10,11</sup>

Tibial stress fractures are overuse injuries, which are often associated with RA in elderly people with osteoarthritis, osteoporosis, or post-traumatic deformity.<sup>12,13</sup> Osteopenia, corticosteroid use, poor nutrition and abnormalities of calcium metabolism decrease the strength of bone and are also significant risk factors for prevention of fracture healing in patients with RA.<sup>14</sup> When

normal alignment of the lower leg is lost due to an unhealed fracture or other condition, deviations from this anatomic norm may become technical obstacles in performing TKA.<sup>15,16</sup>

There is no current information in the literature regarding the operative treatment for tibial nonunion and severe knee arthritis in patients with RA. This article presents two cases of TKA and tibial corrective osteotomy with intramedullary nail for nonunited traumatic and stress fracture of the tibia in patients with RA. The patients provided informed consent, and the authors have no conflicts of interest.

### Case one

A 58-year-old woman was diagnosed with RA 10 years ago and took Deltacortril® 5 mg/week. Gradually, increasing pain in the left knee and tibia deformity made walking difficult. The patient had a left tibia fracture after a fall 9 months ago, which was not treated, leading to nonunion.

On examination, severe knee pain and remarkable varus deformity were observed. Her knee demonstrated  $-20^\circ$  extension with flexion to  $45^\circ$ . She had grade 2 varus instability of the knee. The patient was wheelchair-dependent. The knee score and function scores, according to the Knee Society clinical rating system, were 0 and  $-20$  points, respectively.<sup>17</sup>

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Radiographs showed a limb length discrepancy of 2 cm. There was significant arthritis (Fig. 1). Hypertrophic nonunion was detected on the metaphyseal-diaphyseal junction of the distal tibia (Fig. 2).

The patient underwent surgery for tibial intramedullary nailing and TKA. After the debridement of fibrous tissues and the osteotomy of the nonunion, the alignment of the lower leg was corrected. An intramedullary nail (11,5 mm × 30 cm TRIGEN® IMN System, Smith and Nephew) was inserted distal to the tibial insertion of the anterior cruciate ligament and lateral to the anterior horn of the medial meniscus, on the proximal anterior part of tibial plateau. This site was slightly distal to the routine insertion point. The nail was secured with proximal and distal screws. After nailing, the femoral component (medium, 70 mm), tibial component (medium, 72 mm) and insert (P-S insert, medium, 10 mm) were placed and TKA (Performance® Cemented Knee System, Biomet) was completed.

Postoperatively the patient received low molecular-weight heparin as prophylaxis for deep vein thrombosis and three doses of a second-generation cephalosporin as infection prophylaxis. ROM exercises were initiated on the next postoperative day. Weight-bearing was started on the first postoperative day. The patient used walker for one month, then a crutch until the bone union was complete. Bony union was achieved in 3 months. During this time she continued physical therapy.

Eight years after surgery, the patient was assessed clinically and radiologically (Fig. 3). She had full ROM of her knee of 0°–120° without pain. The knee score and function scores, according to the Knee Society clinical rating system, were 68 and 60 points, respectively.

### Case two

A 54-year-old woman was diagnosed with RA 30 years ago and took methotrexate 6 mg/week and prednisolone 35 mg/week. Gradually, persistent pain in left knee and tibia deformity made



Fig. 2. Preoperatively radiographs of the ankle joint of patient number 1.

walking difficult. Her medical history showed no major trauma before.

On examination, severe knee pain and remarkable flexion and varus deformity on the tibia diaphysis were observed. Her knee demonstrated –15° extension with flexion to 30°. The patient was



Fig. 1. Preoperatively AP and lateral radiographs of the knee joint of patient number 1.

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