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## Case Report

# Post-cam clunk syndrome after posterior stabilized total knee arthroplasty as a sign of early femoral component loosening

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## ABSTRACT

Soft tissue impingements are well-known complications of total knee arthroplasty. The impingements usually occur between the medial or lateral femoral component and tibial insert, and between the patella and femoral components. We report a rare case of impingement of the soft tissue between the femoral intercondylar fossa and post of the polyethylene insert, which caused pain and walking disability. After the surgery for the arthroscopic removal of the soft tissue, the symptoms disappeared. However, prosthetic loosening of the femur occurred several months after the arthroscopic surgery, requiring revision surgery. We would propose to call this symptom as post-cam clunk syndrome.

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## Introduction

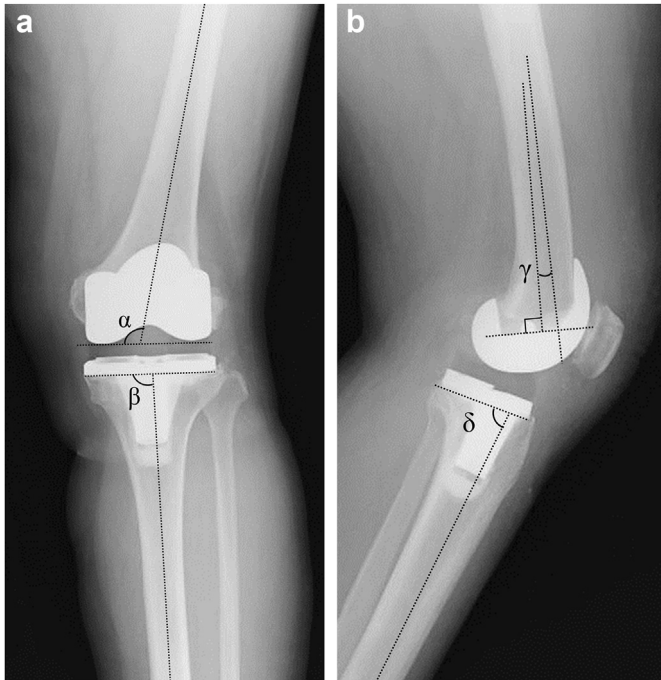
Total knee arthroplasty (TKA) is an effective and safe surgical treatment for end-stage degenerative arthritis of the knee. Clinical results after TKA are considered satisfactory by either surgeons or patients. However, comparatively rare complications after TKA, such as neuromatous pain,<sup>1</sup> damage of polyethylene insert, component, and impingement of soft tissue in the joint space are well known, leading to pain in the knee and gait disturbance. Among the complications, impingements such as patellar clunk syndrome and pseudomeniscus have been previously reported by many authors.<sup>2–7</sup> Herein, we report a rare case of a patient who experienced sudden discomfort because of a central impingement of the soft tissue between the femoral intercondylar fossa and the post of the polyethylene insert after TKA.

## Case report

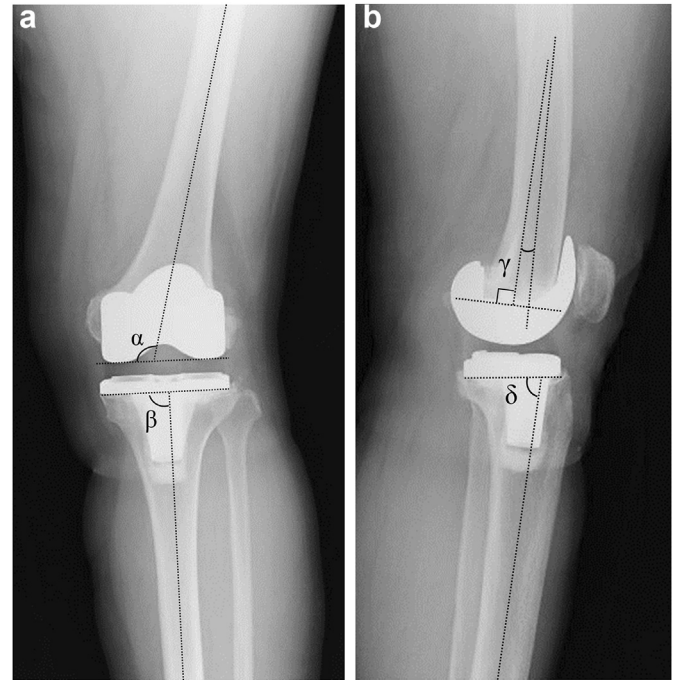
A 54-year-old woman (height, 142 cm; weight, 58 kg; body mass index, 28.8 kg/m<sup>2</sup>) presented at our hospital with pain in the bilateral knees with severe osteoarthritis and varus deformity but without a history of a particular disease. The physical examination result demonstrated that the active range of motion (ROM) was –5° in extension and 120° in flexion; the femorotibial angle (FTA) was 189°. Posterior stabilized (PS) TKA (NexGen LPS Flex, Zimmer, Warsaw, Ind, USA) was performed for the patient by the medial parapatellar approach. Intraoperative soft tissue balancing was performed by Offset Repo-Tensor<sup>®</sup> devise.<sup>8</sup> Postoperative radiographs demonstrated well-aligned implant position in the coronal and sagittal planes (Fig. 1). The patient acquired initial recovery and returned to daily life as within the normal clinical course. Six months after the surgery, her ROM was 0° in extension and 125° in flexion. Approximately 2 years after the surgery, the patient developed a sudden gait disturbance because of pain and a clunking sensation during walking and active motion, without any cause. Although the passive ROM was almost the same as that during initial recovery after the surgery, active motion in extension was hyperextended to 5°, with a clunking sensation but without pain. During active knee motion, slight subluxation of the femorotibial

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**Fig. 1.** Postoperative anteroposterior (A) and lateral (B) plain radiographs of total knee arthroplasty (TKA). The  $\alpha$  angle, which is the medial angle between the anatomical axis of the femur and the tangent of the femoral component, was  $101^\circ$ . The  $\beta$  angle, which is the medial angle between the anatomical axis of the tibia and the line parallel to the tibial tray, was  $91^\circ$ . The sagittal femoral gamma ( $\gamma$ ) angle, which is the proximal angle between a line drawn perpendicular to the distal cement interface of the femoral component and the femoral anatomical axis in the lateral radiograph, was  $2^\circ$ . The sagittal tibial delta ( $\delta$ ) angle, which is the posterior angle between a line drawn parallel to the tibial component and the anatomical tibia axis in the lateral radiograph was  $85^\circ$ .



**Fig. 2.** Anteroposterior (A) and lateral (B) plain radiographs at the time of arthroscopic surgery. The  $\alpha$  angle was  $103^\circ$ ;  $\beta$  angle,  $90^\circ$ ;  $\gamma$  angle,  $2^\circ$ ; and  $\delta$  angle,  $82^\circ$ .

the surgery, the patient was able to return to daily life without any symptoms of the knee at the time of two year follow up.

## Discussion

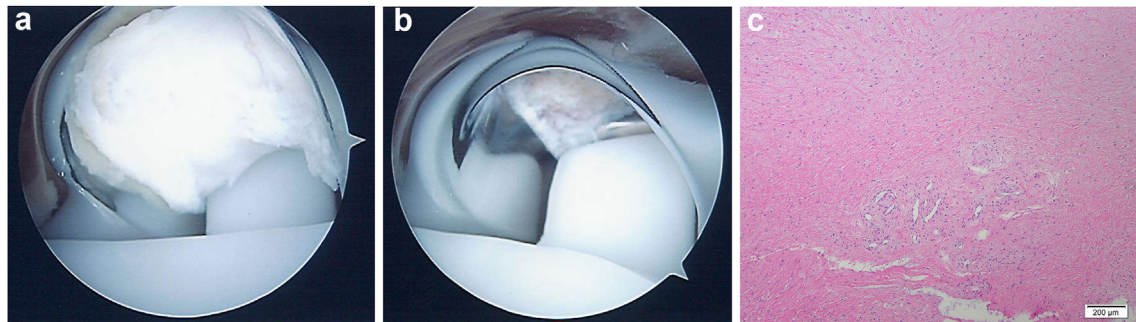
Soft tissue impingements in the knee joint space, such as patella clunk syndrome or pseudomeniscus, are well-known complications of TKA,<sup>2–4</sup> which can be diagnosed and frequently treated with arthroscopic surgery. Numerous numbers of studies on patellofemoral or femorotibial joint problems have been published in the literature.<sup>2–7,9–21</sup> However, the focus of the present case was on the post-cam function. To our knowledge, only a few cases of post-cam dysfunction have been reported.

Carro and Suarez<sup>5</sup> reported a similar complication in which a thickened fibrotic band in the intercondylar notch was trapped at a  $25^\circ$  flexed position between the polyethylene peg and the prosthetic trochlea in a PS-designed TKA. They also treated the symptoms by arthroscopy, and the symptoms disappeared. While their case had extension restriction with the fibrous nodule, our case had no extension restriction. In addition, clunking sensation occurred during walking and active motion in the slight knee flexion in our case. The fibrous nodule reported by Carro and Suarez was in front of the post of the polyethylene insert, whereas in our case, the fibrous nodule existed on top of the post of the polyethylene insert and arised from the femoral bony tissue.

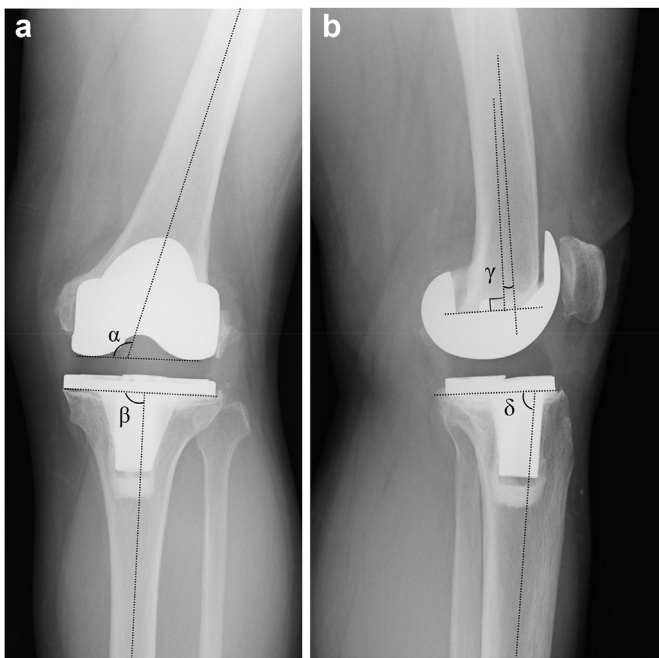
Probably early micromovement or sinking of the femoral component could have induced a proliferation of soft tissue between the post of the tibial insert and the intercondylar fossa of the femur. In our case, the symptoms were improved temporarily, but eventually femoral component loosening occurred; thus, revision surgery was required to relieve the symptoms of the patient.

The features of this complication after TKA, which we would call “post-cam clunk syndrome”, are as follows: (1) complication of high-flexion PS-designed TKA; (2) clunking sensation during walking and active motion in slight knee flexion; (3) soft tissue nodule impingement between the top of the post of the

joint with pain was observed from  $20$  to  $30^\circ$  in flexion. No sign of infection was found in the blood examination results, or any fracture on the radiographs and CT examination. On physiological examination, the patient had no focal tenderness and erythema. Plain radiographs demonstrated very minimal sinking of the femoral component and minimal valgus tendency (Fig. 2). Arthroscopic surgery was performed for the purpose of diagnosis and treatment. The arthroscopic findings indicated that the soft tissue existed on the surface of the femoral bone in the intercondylar fossa (Fig. 3). No abnormal finding was apparent in the other sites of the knee joint such as medial or lateral compartment, or patello-femoral joint. The appearance of the soft tissue showed a thick white nodule measuring approximately  $2 \times 1$  cm, with the thick soft tissue interposed between the top of the post of the polyethylene insert and femoral bone in the intercondylar fossa. During passive knee motion under general anesthesia, the clunk between the nodule and the post of the insert, and subluxation of the femorotibial joint occurred simultaneously. These phenomena disappeared after the soft tissue was removed (Fig. 3). One day after the procedure, the patient was completely relieved from the pain and clunking sensation, and returned to daily life. Active ROM returned to  $0^\circ$  in extension and  $120^\circ$  in flexion after the removal of the soft tissue. The pathological finding indicated that the tissue was a fibrous granulation and regenerating bone tissue (Fig. 3). After the arthroscopic surgery, the good condition of the knee was maintained, enabling the patient to return to daily life for several months. However, she developed gait disturbance again 7 months after the arthroscopic surgery. Based on the plain radiographs and clinical course, loosening of the femoral component was diagnosed (Fig. 4). Hence, surgery for prosthesis revision was performed. After



**Fig. 3.** a. The arthroscopic finding indicated that the soft tissue was observed on the surface of the femoral bone in the intercondylar fossa. b. Under arthroscopy, the soft tissue was removed. c. Microphotograph of the resected nodule (hematoxylin-eosin staining) demonstrating fibrous granulation and regenerating bone tissues.



**Fig. 4.** Anteroposterior (A) and lateral (B) plain radiographs before the revision surgery. The  $\alpha$  angle was  $106^\circ$ ;  $\beta$  angle,  $90^\circ$ ;  $\gamma$  angle,  $2^\circ$ ; and  $\delta$  angle,  $84^\circ$ .

polyethylene insert and the femoral bone in the intercondylar fossa; (4) and relief of symptoms after surgical removal of the impinged soft tissue. This symptoms may indicate the onset of femoral component loosening. Therefore, we must be extremely cautious that any type of impingement after TKA may indicate the sign of early loosening of the component. Thus extreme attention should be paid and precise examination such as CT scanning and bone scanning should be done if the patient develops this type of syndrome.

The symptom of post-cam clunking syndrome is the sign of loosening of the femoral component of the prosthesis; therefore, arthroscopic treatment may have only a temporary effect and significantly careful approach is needed when this type of syndrome occurred. Eventually, it should be noted that revision surgery might be needed for this syndrome.

#### Conflicts of interest

The authors have no conflicts of interest relevant to this article.

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