Incidental Asymptomatic Fibular Stress Fractures Presenting as Varus Knee Osteoarthritis: A Case Report

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Authors:
Taylor J. Freetly, MS Yair D. Kissin, MD, FAAOS Andrew Carbone, MD Michael A. Kelly, MD
Author Affiliation | Disclosures

Taylor Freetly, SUNY Upstate Medical University, Syracuse, New York. Yair D. Kissin, Department of Orthopaedic Surgery, Hackensack University Medical Center, Hackensack, New Jersey. Andrew Carbone, Department of Orthopaedic Surgery, Rutgers New Jersey Medical School, Newark, New Jersey. Michael A. Kelly, Department of Orthopaedic Surgery, Hackensack University Medical Center, Hackensack, New Jersey.

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Address correspondence to: Yair D. Kissin, MD, FAAOS, Orthopaedic Surgery, Hackensack University Medical Center, 360 Essex Street, Suite 303, Hackensack, NJ 07601 (tel, 551-996-8867; fax, 551-996-8873; email, yair.kissin@hackensackmeridian.org).

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Take-Home Points

- Proximal fibular stress fractures in patients with primary osteoarthritis and fixed varus deformity have rarely been reported.
- Stress fractures occurring near the knee in the setting of a varus deformity generally occur on the compression side of the tibia and are symptomatic.
- Proximal fibular stress fractures may present as an incidental finding of an expansile deformity on plain films in patients with varus osteoarthritic knees.
- Magnetic resonance imaging is rarely indicated in the evaluation of degenerative joint disease; however, it was justified in our case to rule out neoplasm.
- When present in the setting of an osteoarthritic varus knee, stress fractures of the proximal fibula should heal with conservative treatment and should not affect the plan or outcome of TKA.

The proximal fibula is a rare site for stress fractures, with most of these fractures occurring in military recruits.¹ To the authors’ knowledge, there has been only 1 documented case of a proximal fibular stress fracture in patients with severe osteoarthritis (OA) and fixed varus deformity, which mimicked L5 radiculopathy.² We are not aware of any reports of asymptomatic tension-side fibular stress fractures in varus knees. In our 2 cases, the patients were indicated for total knee arthroplasty (TKA) for varus degenerative joint disease after failing nonoperative treatment; however, further work-up was justified to rule out neoplasm after plain films revealed expansile deformities of the proximal fibular shaft. Each patient subsequently underwent magnetic resonance imaging (MRI)
with and without gadolinium contrast, which demonstrated a healed and healing proximal fibular stress fracture. Magnetic resonance imaging is rarely indicated in the evaluation of degenerative joint disease, and stress fractures about a varus knee generally occur on the compression side of the tibia and are symptomatic. The patients provided informed written consent for print and electronic publication of this case report.

Case Report

The first patient was a 77-year-old male who presented with longstanding knee pain, left greater than right, exacerbated by weight-bearing activities. The patient had no improvement with physical therapy or anti-inflammatory medication. He denied any history of trauma, weakness, paresthesias, or a recent increase in activity. The patient also denied any fevers, chills, night sweats, or other constitutional symptoms. On physical examination, the patient had an antalgic gait and limited range of motion bilaterally. Examination of his right lower extremity demonstrated a fixed 5° varus deformity. No distinct point tenderness was noted.

Radiographs of the right knee demonstrated varus deformity and tricompartmental degenerative changes with severe medial joint space narrowing. An expansile deformity of the proximal right fibular shaft was also noted (Figure 1), which was not present on the films 2 years earlier (Figure 2). The absence of this deformity on previous imaging raised the suspicion of a tumor. An MRI with and without gadolinium, which was obtained to rule out a neoplastic process, showed an old, healed proximal fibular shaft fracture with chronic periosteal reaction (Figure 3). There was no narrow edema to suggest acute injury and no neoplastic lesion. He was reassured regarding the benign findings and was scheduled for a left TKA, as his pain was more severe on the left knee. The patient’s stress fracture healed without complications, and he underwent a successful left TKA. He returned approximately 6 months after his procedure with worsening right knee pain and underwent a successful TKA on the right knee as well.

The second patient was a 67-year-old male with longstanding bilateral knee pain, right greater than left, with no antecedent trauma. He denied a history of increased activity, or weakness or paresthesias. He denied any fevers, chills, night sweats, or other constitutional symptoms. One year prior to presentation at our clinic, he had received corticosteroid injections and hyaluronic acid, without relief. The patient also had a history with another surgeon of arthroscopy 1 year earlier and subchondroplasty 3 years before presentation to our clinic. On physical examination, the patient’s right knee displayed a fixed 7° varus deformity with decreased range of motion, effusion, and diffuse crepitus. Further examination revealed tenderness to palpation of the proximal fibula.

Radiographs of the right knee showed degenerative joint disease with varus deformity and medial compartment joint space narrowing. They also demonstrated an expansile deformity of mixed lucency and sclerosis involving the proximal right fibular shaft (Figure 4). Although these findings appeared to be consistent with a stress fracture, their appearance was also suspicious for a neoplasm. To rule out malignancy, an MRI with and without gadolinium was obtained that revealed a healing stress fracture of the proximal fibula (Figure 5). The patient was reassured, and plans were made to proceed with a TKA. The patient’s stress fracture healed without complications, and he underwent successful right TKA. Radiographs from the patient’s 8-week follow-up showed a healed fibular stress fracture (Figure 6).

Discussion

To our knowledge, this is the first report of incidental tension-side stress fractures in varus osteoarthritic knees. Stress fractures have been classified into 2 groups, fatigue fractures and insufficiency fractures. Fatigue fractures
occur when abnormal stress is applied to normal bones, and insufficiency fractures result when normal stress is applied to abnormal bones.\textsuperscript{8} Stress fractures can also be classified into risk categories based on which bone is involved and the loading of the bone.\textsuperscript{9} Sites loaded in tension have increased risk of nonunion, progression to complete fracture, and reoccurrence compared with sites loaded in compression.\textsuperscript{8} Stress fractures of the fibula occur rarely, and when present, they are more commonly observed in the distal fibula in athletes and military recruits.\textsuperscript{1} Stress fractures occur rarely in patients with primary OA, and when present in this setting, obesity and malalignment are the contributing factors.\textsuperscript{3} Neither patient was obese in our case (body mass index of 27 and 28, respectively), but significant varus deformity was present in both patients. Stress fractures occurring near the knee in the setting of a varus deformity generally occur on the compression side of the tibia and are symptomatic.\textsuperscript{3,7}

Regarding malalignment, Cheung and colleagues\textsuperscript{10} reported about a case of an elderly female with OA of the knee with valgus deformity that initially developed a proximal fibular stress fracture followed by a proximal tibial stress fracture. However, both of our patients had varus deformities. Mullaji and Shetty\textsuperscript{3} documented stress fractures in 34 patients with OA, a majority with varus deformities, but did not report any isolated proximal fibular stress fractures. Manish and colleagues\textsuperscript{7} reported the only documented case of an isolated proximal fibular stress fracture in a patient with osteoarthritic varus deformity. The patient presented initially with pain and paresthesias of the lower thigh and leg consistent with an L5 radiculopathy. They believed that the varus deformity and the repetitive contraction of the lateral knee muscles put increased shear forces on the fibula leading to the stress fracture. Our patients did not present with any radicular symptoms, a history of acute worsening pain, or an increased activity concerning for a stress fracture. Instead, our patients presented with progressively worsening knee pain typical of severe OA and incidental findings on imaging of tension-side fibular stress fractures. An MRI with and without gadolinium confirmed the diagnosis of a healed fracture in our first patient and a healing fracture in our second patient.

**Conclusion**

Although exceedingly rare in osteoarthritic varus knees, we presented 2 cases of MRI-confirmed proximal fibular stress fractures in this report. As demonstrated, patients may present with symptoms of OA or radicular symptoms as described by Manish and colleagues.\textsuperscript{2} Presentation may also include an expansile lesion on imaging, prompting a differential diagnosis that includes a neoplasm. If present in the setting of an osteoarthritic varus knee, stress fractures of the proximal fibula should heal with conservative treatment and not affect the plan or outcome of TKA.

**Key Info**

**Figures/Tables**

Figures / Tables:
Figure 1. Standing anterior–posterior radiograph of the right knee with weight-bearing, showing varus deformity, tricompartmental degenerative changes, severe medial joint space narrowing, and an expansile deformity of the proximal right fibular shaft.
Figure 2. Standing anterior–posterior radiograph of the right knee with weight-bearing obtained 2 years earlier, revealing no fracture or an expansile deformity of the proximal fibula.
Figure 3. MRI of the right knee with and without gadolinium contrast ruled out neoplasm. This reveals a healed proximal fibular shaft fracture with chronic periosteal reaction and no marrow edema suggesting acute injury.
Abbreviation: MRI, magnetic resonance imaging.
Figure 4. Standing anterior–posterior radiograph of the right knee with weight-bearing, demonstrating a moderately expansile deformity of mixed lucency and sclerosis involving the proximal fibular shaft, with a more linear area of lucency along the dorsal cortex.
Figure 5. MRI of the right knee with and without gadolinium contrast obtained to rule out neoplasm. This displays a nondisplaced fracture obliquely oriented involving the proximal fibular shaft with cortical thickening related to sclerosis in the setting of a healing process. Abbreviation: MRI, magnetic resonance imaging.
References


**Multimedia**

**Product Guide**

**Product Guide**

- STRATAFIX™ Symmetric PDS™ Plus Knotless Tissue Control Device
- STRATAFIX™ Spiral Knotless Tissue Control Device
- BioComposite SwiveLock Anchor
- BioComposite SwiveLock C, with White/Black TigerTape™ Loop

**Citation**

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