

One-stage total knee arthroplasty for the treatment of acute tibial varus stress fracture secondary to osteoarthritis

Dear Editor,

Stress or fatigue fractures occur in normal bones subjected to abnormal forces such as repeated mechanical stress. This condition is frequently seen in athletes and military recruits.^[1] Furthermore, specific conditions such as osteoarthritis, rheumatoid arthritis, and posttraumatic deformity predispose the incidence of stress fracture owing to the asymmetrical pressure on specific bones.^[2]

Surgical treatment of stress fractures in the context of osteoarthritis is challenging. Various surgical options are available, including internal fixation of the fracture alone, or simultaneous treatment of fracture and osteoarthritis using two-stage total knee arthroplasty (TKA) or one-stage TKA with a long-stem tibial component.^[3]

TKA with long-stem tibial component for the treatment of tibial varus stress fracture secondary to osteoarthritis has already been described in earlier studies.^[3] In this letter, we describe our in-house approach for the treatment of acute tibial varus stress fracture secondary to osteoarthritis using one-stage long-stem TKA, without open reduction, plating, and bone graft. Our technique has several advantages: it does not require fracture fixation before TKA, it does not need fracture exposure, and it allows a smaller length and diameter of the stem.

We usually use posterior cruciate ligament substituting design for the treatment of our patients (and sometimes more constrained devices). After the inflation of the tourniquet, the skin is opened through a standard midline incision and the joint is approached through a medial parapatellar arthrotomy, without exposing the fracture site. Then, we perform distal femoral valgus cuts due to the intramedullary angle. Medial soft-tissue release (deep medial collateral ligament release) is done for mediolateral balancing. The tibia is subluxated forward. Because of the fracture-induced deformity, indirect reduction of proximal and distal tibial segments is obtained with

the intramedullary guide. The two segments are held in alignment and checked under the C-arm.

For using a long stem at least one inch below the fracture site, the canal is reamed progressively. In our approach, there is no need to fit the stem for the tibial canal. The trial stem is attached to the trial base plate and reduction is achieved. Then, the alignment is re-checked with the C-arm.

After femoral sizing, flexion and extension gap balancing are performed and appropriate components are assembled. Routinely, we use cement for the femoral component. However, to prevent cement migration to the fracture site, only the tibial base plate, the keel, and the proximal part of the stem are usually cemented. Finally, an appropriate insert is used and the surgery is ended [Figure 1].

The long stem acts as an internal fixator for the fracture. Therefore, there is no need for open reduction and exposing the fracture site. In addition, it requires a single anesthesia, thereby causing less morbidity and faster recovery. Therefore, one-stage TKA with a long tibial stem could be suggested as an option for tibial stress fractures in elderly patients with degenerative changes of the knee and associated deformity. Even so, potential complications of TKA using a long tibial stem, such as intraoperative periprosthetic fracture and longer duration of surgery, should be taken into consideration.^[4]

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

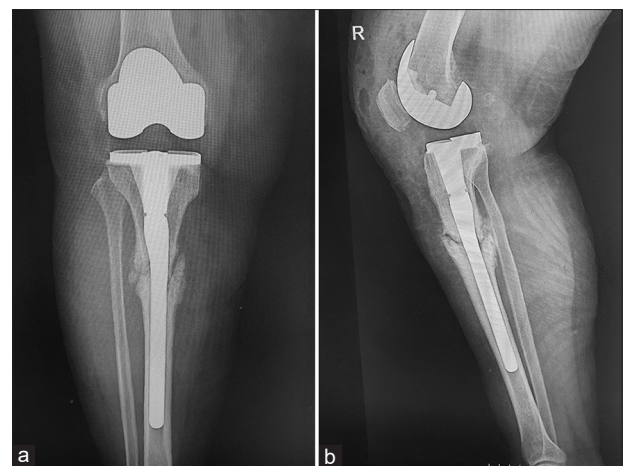


Figure 1: Postoperative anteroposterior (a) and lateral (b) radiographs of the acute tibial varus stress fracture treated with one-stage long-stem total knee arthroplasty, without open reduction, plating and bone graft

**Abolfazi Bagherifard¹, Mahmoud Jabalameli¹, Sina Talebi^{1,2},
Hooman Yahyazadeh^{1,3}**

¹Bone and Joint Reconstruction Research Center, Department of Orthopedics, School of Medicine, Iran University of Medical Sciences, Tehran, Iran, ²Department of Orthopedics, Isfahan University of Medical Sciences, Isfahan, Iran, ³Department of Orthopedic Surgery, Farhikhtegan Hospital, Faculty of Medicine, Islamic Azad University, Tehran Medical Branch, Tehran, Iran

Address for correspondence:

Dr. Sina Talebi,
Shafa Orthopedic Hospital, Baharestan Square, Tehran, Iran.
E-mail: sinatalebi3969gm@gmail.com

Submitted: 15-Mar-2023; **Revised:** 25-Jun-2023;

Accepted: 28-Jun-2023; **Published:** 29-Sep-2023

REFERENCES

1. Astur DC, Zanatta F, Arliani GG, Moraes ER, Pochini Ade C, Ejnisman B. Stress fractures: Definition, diagnosis and treatment. *Rev Bras Ortop* 2016;51:3-10.
2. Bennell K, Matheson G, Meeuwisse W, Brukner P. Risk factors for stress fractures. *Sports Med* 1999;28:91-122.
3. Soundarrajan D, Rajkumar N, Dhanasekararaja P, Rajasekaran S. Proximal tibia stress fracture with osteoarthritis of knee – Radiological and functional analysis of one stage TKA with long

stem. *SICOT J* 2018;4:13.

4. Jabalameli M, Hadi HA, Bagherifard A, Rahbar M, Minator Sajjadi M. Long-stem total knee arthroplasty for proximal tibial stress fractures in the elderly patients. *Arch Bone Jt Surg* 2018;6:376-80.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Access this article online

Quick Response Code:



Website:

<https://journals.lww.com/jrms>

DOI:

10.4103/jrms.jrms_182_23

How to cite this article: Bagherifard A, Jabalameli M, Talebi S, Yahyazadeh H. One-stage total knee arthroplasty for the treatment of acute tibial varus stress fracture secondary to osteoarthritis. *J Res Med Sci* 2023;28:72.

© 2023 Journal of Research in Medical Sciences | Published by Wolters Kluwer - Medknow