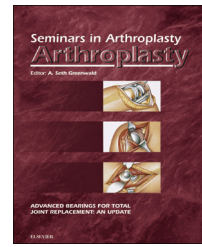


Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

[www.elsevier.com/locate/semarthroplasty](http://www.elsevier.com/locate/semarthroplasty)

# The stiff knee: Causes and cures

Michael D. Ries, MD, ScM



Tahoe Fracture and Orthopaedic Clinic, 973 Mica Dr #201, Carson City, NV 89705

## ARTICLE INFO

### Keywords:

Total knee arthroplasty  
Stiffness  
Arthrofibrosis  
Manipulation  
Revision

## ABSTRACT

Gender, race, age, BMI, and pre-operative motion have been correlated with post-operative motion after TKA. Surgical techniques to achieve full motion include appropriate sizing and positioning of the implants, proper gap balancing and soft tissue release, removal of posterior condylar osteophytes, and adequate tibial slope. Patient education, pain management, and participation in post-operative rehabilitation are also important. If adequate motion is not achieved, then manipulation can be helpful particularly up to 3 months after surgery. Once scar tissue is more mature, 6 months to a year after surgery, arthroscopy to resect arthrofibrotic scar is an appropriate option. For stiffness beyond 1 year after surgery revision, TKA can be expected to result in modest improvement in motion, but pain relief may be quite variable.

© 2015 Elsevier Inc. All rights reserved.

## 1. Introduction

Limited motion is associated with functional impairment and lack of satisfaction after total knee arthroplasty (TKA). The development of limited motion after TKA is often multifactorial. Patient-related factors that can contribute to limited motion include poor pre-operative motion, patella infera, hip flexion contracture, leg length inequality, habitual narcotic use, morbid obesity, and possible genetic factors that lead to a biologic predisposition to form scar tissue. African American race, female gender, age less than 60 years, BMI greater than 30, and nicotine dependence have been associated with an increased risk of manipulation after TKA [1]. Surgical factors include femoral or tibial component internal rotation, overstuffed patellofemoral compartment, overstuffed flexion space, retained posterior osteophytes, tight posterior cruciate ligament (PCL) in cruciate retaining (CR) knee, inadequate tibial posterior slope, and inadequate posterior condylar offset [2–4]. Other factors include inadequate pre-operative education, inadequate post-operative pain management, inadequate post-operative physical therapy, and persistent post-operative effusion [5,6].

## 2. Patient-related factors

Poor pre-operative motion has been associated with poor post-operative motion [7]. This may be related to extra and/or intra-articular sources of stiffness. Limited excursion in the extensor mechanism due to long standing extra-articular soft tissue contracture such as in hemophiliacs or after prior trauma can restrict knee flexion. This could require extensor mechanism lengthening to improve post-operative motion, while stiffness due to intra-articular scar tissue may be improved by removal of arthrofibrotic scar during TKA. However, arthrofibrotic scar also frequently recurs after surgery leading to persistent stiffness [8–10].

Patella infera results from contracture in the patellar ligament and is usually associated with prior surgery or trauma. Patella infera causes relative shortening of the extensor mechanism and more difficult exposure during surgery, which may require extensile exposure techniques such as rectus snip or tibial tubercle osteotomy during TKA. Extra-articular sources of knee flexion contracture include ipsilateral hip flexion contracture, leg length inequality, and neuromuscular disease. An ipsilateral hip flexion contracture or contralateral short limb can result in inability to fully

E-mail address: [riesm@orthosurg.ucsf.edu](mailto:riesm@orthosurg.ucsf.edu)

<http://dx.doi.org/10.1053/j.sart.2015.08.010>

1045-4527/© 2015 Elsevier Inc. All rights reserved.

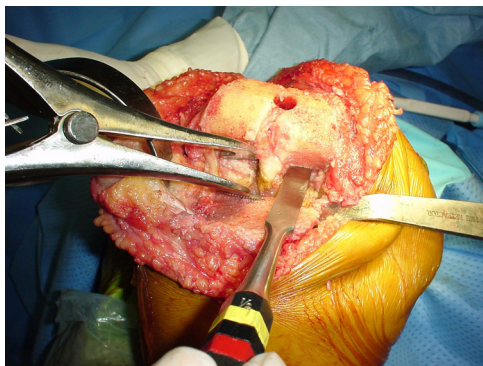
extend the knee during weight-bearing activities and resultant flexion contracture. Hip extension may similarly limit quadriceps excursion and knee flexion [11]. Habitual narcotic use, poor pain tolerance, and anxiety can also restrict the ability a patient has to participate actively in post-operative rehabilitation, which is important to achieve full functional recovery after TKA. Patients with morbid obesity also can have restricted knee flexion due to calf/thigh soft tissue impingement. Some patients may be predisposed to develop scar tissue leading to arthrofibrosis and limited motion [12]. However, the specific genetic or biologic factors which may be associated with abundant scar tissue formation have not been well defined.

### 3. Surgical factors

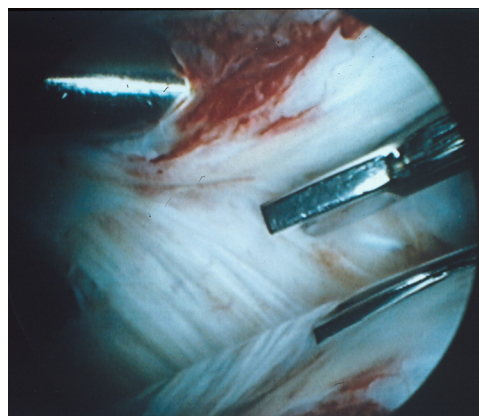
Proper surgical technique is important to permit full range of motion after TKA. Balanced flexion and extension gaps are important to provide knee stability after TKA, and also permit restoration of knee motion. A tight extension space limits knee extension, while a tight flexion space limits knee flexion [13]. Mechanical sources of tibiofemoral impingement that can restrict knee flexion include retained posterior osteophytes and inadequate restoration of posterior femoral condylar offset [14]. A tight ligament in flexion can also restrict motion. Inadequate tibial slope or a tight PCL can restrict flexion. Femoral component internal rotation may also cause relative tightening of the MCL during knee flexion which restricts motion [4]. An overstuffed extension space that limits full excursion of the extensor mechanism can also contribute to limited knee motion [2].

### 4. Other factors

Although post-operative effusions usually diminish over time as soft tissues heal, a persistent effusion can cause a mechanical limitation to knee flexion. Aspiration of the knee may be helpful to regain motion if an effusion restricts flexion after TKA. Inadequate pre-operative education can lead to anxiety and poor preparation for management of post-operative pain [5]. Adequate post-operative pain



**Figure 1** – An intraoperative view shows the distal femur distracted from the tibial cut surface with a laminar spreader to expose the posterior compartments. Posterior femoral osteophytes are removed with a curved osteotome.

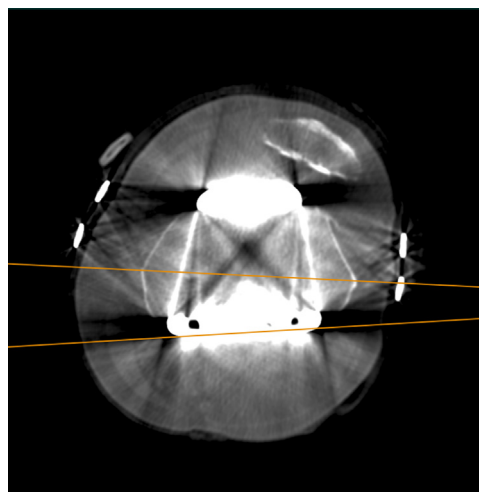


**Figure 2** – An intraoperative view of the patellofemoral joint during arthroscopy shows vertical adhesions between the extensor mechanism and distal femur, which are resected with arthroscopic instruments.

management is important to permit active participation in rehabilitation and exercise after surgery [6]. Access to physical therapy may also be restricted for some patients due to insurance limitations, travel restrictions, or conflicting time commitments.

### 5. Treatment

Surgical techniques during TKA should maximize motion while maintaining stability. A tight flexion space may restrict motion due to collateral ligament or PCL tension, while a loose flexion space can result in symptomatic instability. Proper femoral component sizing is important to maintain adequate posterior condylar offset and minimize risk of tibiofemoral impingement in flexion [14]. Posterior femoral condylar osteophytes can be removed after the bone cuts have been made using a curved osteotome (Fig. 1). Posterior



**Figure 3** – A CT view of the distal femur illustrates internal rotation of the posterior femoral condylar line (lower yellow line) relative to the epicondylar axis (upper yellow line). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Download English Version:

<https://daneshyari.com/en/article/4093829>

Download Persian Version:

<https://daneshyari.com/article/4093829>

[Daneshyari.com](https://daneshyari.com)