4. Stiff or Painful Knees after TKA

A. The Stiff TKR; (Norman A. Johanson, 1997.)

1. Introduction & Definitions;
* Recovery period; A Pt. whose knee by clinical exam. has 90° of flex. & comes to within 10° of full exten. & who has no complaints of pain or functional difficulties is not considered to have a stiff knee.
* A Pt. 1 year after TKR who has clinically acceptable motion but who complains of knee stiffness, has difficulty getting out of a chair, has pain on climbing stairs, & walks with an observably stiff-knee gait should be further evaluated for underlying knee problems.
* Stiffness is closely related to Pt.’s own motivation to gain a functional ROM, and his or her willingness to endure pain to achieve that goal.

Pt. of minimal supportive care; more stiffness complain.
* Stiffness, which is nearly always present during the early postop. period, gradually decreases over time, & is, therefore, a valuable marker of improvement throughout the recovery period.
* Surgical pain is the most important cause of early knee stiffness. It results in both quadriceps & hamstring guarding & makes passive flex. & ext. difficult to perform.
* This factor has formed the theoretical basis for implementation of in-hospital continuous CPM. CPM has no capacity to promote knee exten.
* Postop. knee stiffness usually subsides within 6 to 8 wks. Knee ROM generally improves steadily through the first 3 mns, & then less rapid progress may be seen for an additional 9 mns or more.
* If a limited or deteriorating ROM occurs, the following Cx should be considered: 1) infection, 2) mechanical Cxs related to the implant or soft tissue, 3) impending arthrofibrosis, & 4) reflex sympathetic dystrophy(if associated with severe pain & vasomotor skin changes).
* The late onset of knee stiffness following a relatively symptom-free period may be suggestive of one of the following conditions: 1) infection, 2) overuse synovities or tendinitis, 3) synovitis secondary to RA, particulate wear debris, or recurrent hemarthrosis, & 4) implant loosening or breakage.

2. Pathophysiology of joint stiffness; (Shawn W O’Driscoll, 2000)

The 4 stages of stiffness:
1) Bleeding; The first stage of stiffness, occurring within minutes to hours following articular surgery or trauma.
2) Edema; the second stage, occurs during the next few hours or days.
3) Granulation tissue; The third stage, occurs during the first few days or weeks.
4) Fibrosis; During this fourth stage, the granulation tissue matures, forming dense, rigid scar tissue(collagen type I fibers).
3. Causes of TKR Stiffness;

1) Infection:
   Early infection(within the first 6 weeks):
   Late infection:

2) Mechanical Problems(Implant/Soft tissue):
   *Inadequate bone resection combined with persistent ligamentous imbalance or tightness may result in knee stiffness.

   *If, during trial reduction, asymmetric or symmetric tightness is recognized, it can be corrected by either revising the bone cuts, releasing the ligaments, or a combination of the two.

   *If a flexion contracture is present, more distal femur should be resected and/or a posterire capsular release performed.

   *If the residual contracture is severe(>15°), some additional bone may be removed from the proximal tibia, provided that doing so does not make the flexion gap too wide. However, if tibial resection is essential & the flex. gap threatens stability in flexion, the femoral component could be set more posteriorly with augmentation, either by cutting more bone anteriorly or by using a larger size fem. component.

   *The problem of tightness in flexion is most important from the standpoint of postop. knee stiffness. If tightness is recognized intraop., PCL recession can be considered or the tibia can be cut again at neutral or with a 5° post. slope.

   *The selection of an oversized femoral component or the post. placement of the component can lead to a disproportionately narrow flexion gap. It is difficult to manage this problem by resecting more tibia, especially if the extension gap is adequate, because resection of additional tibia may lead to an unacceptable amount of laxity in extension. Downsizing the femoral component and resecting more post. femur will expand the flex. gap without affecting stability in exten.

   *Inadequate release of tight capsular and ligamentous structures is an important cause of the stiff TKR, but is difficult to measure. Poor flex. & exten. may result from inadequate release or recession of a tight PCL. Flex. contractures most commonly result from inadequate post. capsular release in conjunction with insufficient bone resection. The MCL in varus deformities, and the LCL and iliotibial band in valgus deformities often require release to prevent asymmetric implant wear and to promote optimal range of knee motion. Ext. rotation of the fem. component has been recommended to enhance lig. balancing in flex. & to facilitate optimal pat. tracking.

   *Although not necessarily a causative problem in TKR stiffness, pat.-fem. dysfunction may cause pain that may promote stiffness because of disuse.

   *Conversely, pat.-fem. pain may result from knee stiffness, particularly with flex. contractures. The following pat. conditions should be considered when evaluating the stiff TKR: 1) pat. not resurfaced. 2) inadequate lat. release, 3) asymmetrical cutting of pat., 4) excessive elevation of the joint line, 5) internal rotation of the fem. component, 6) the formation of intra-articular adhesions that tether pat. to surrounding structures, thereby altering the normal tracking mechanism, 7) pat. fx., and 8) pat. component loosening. All of these problems may be clinically evident by either loss of ROM or by Pt. complaints of stiffness.

   *The generation of an excessive volume of wear debris over a given period of time causes synovitis, with pain, stiffness, and swelling being the usual result. Poor quality polyethylene, high Pt. weight and activity level, failure to remove cement and bone debris from knee joint, or implant design factors(contact stresses, poly distribution) are possible causative factors.