The Unhappy total knee replacement patient whose X-rays look fine

Can we predict, prevent and treat

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Introduction:

Total knee replacement (TKR) is an effective treatment for end stage osteoarthritis and is performed with the several goals, but primarily resolution of pain and improvements in function. These objectives are successfully met in 80%-90% of patients. The remainder are unhappy with the outcomes of their surgery(1)(2)(3)(4). In comparison, only 7% of patients remain dissatisfied following a total hip replacement. (5) Dissatisfaction after TKR is seen in the presence of objective gains in range of motion (ROM), alignment and patient derived outcome scores postoperatively. Hence, a substantial number of patients with what the surgeon considers a well-functioning joint replacement remain dissatisfied with the outcome of surgery. A number of factors have been identified to be associated with dissatisfaction, the most significant being inappropriately high expectations in some patients, unexplained pain, poor function and psychological factors.

Expectations:

The expectations of patients in terms of surgical morbidity, time to recovery, resolution of pain and restrictions in activities following a TKR are highly variable. Satisfaction from TKR depends on post operative fulfillment of these expectations held in the mind of the patient but not necessarily expressed to the surgeon or hospital staff. It has also been suggested that post operative expectations are more important determinants of satisfaction when compared to preoperative satisfaction as patients tend to realign their expectations after the experience of surgery and rehabilitation(6). It has been shown that failure to meet patient expectations is one of the major cause for dissatisfaction following surgery(3)(7). Accordingly, it is important to assess the expectations of patients before and after surgery, identify patients with unrealistically high expectations and counsel them about the likely outcomes following TKR. A patient with symptoms and disability out of proportion to what would be expected from radiographs is well down the pathway to dissatisfaction before any surgery has been performed

Pain:

Pain after TKR has many treatable causes such as sepsis, periprosthetic fracture, impingement, malalignment, instability, inappropriate sizing and extensor mechanism problems. These are not the subject of this symposium. However, there are certain subsets of patients who suffer from pain after TKR in the absence of an obvious cause. Patient
characteristics which can influence residual pain after TKR include age at the time of surgery, gender and emotional status of the patient.

Patients less than 60 years at the time of surgery are at higher risk of residual pain after TKR compared to older patients. Whilst this could potentially be related to higher activity levels and higher expectations in the younger patients, there is the suggestion of poor pain tolerance in younger patients. It is also possible that the decision to proceed to TKR is a variable measurement and those who elect to have surgery younger do so as a result of a lower pain tolerance.

Sex is a factor—Singh et al. reported that women are 45% more likely to report moderate to severe pain 2 years after TKR than males.

Psychological distress in the form of anxiety and depression can influence pain after surgery. Brander et al found that depression is associated with severe post operative pain. A patient’s belief in the significance of pain is known to affect their response to pain. This can be measured utilising the Pain Catastrophizing Scale (PCS) developed by Sullivan. Patients with persisting pain 2 years after TKR had a higher preoperative PCS score suggesting a maladaptive response to pain.

Function:

The functional demands placed by patients on their replaced knee are highly variable and depend on age of the patient, their preoperative activity levels and their expectations. Young and physically active patients tend to place higher demands on their knees and accordingly are more at risk of been dissatisfied if they are unable to perform their desired activities. Patients with the more modest expectation that following surgery they will be able to perform their activities of daily living (ADL) without limitations are more likely to be satisfied. Discomfort in ADL leads to dissatisfaction. For example, some implant designs are marketed to allow for deep flexion. Inability to squat after surgery (an important part of daily routine for Asian patients) despite use of an implant said to be manufactured to allow this will lead to dissatisfaction in some patients.

Preoperative identification of functional demands of the patients is of paramount importance in choosing the right implant and providing the correct advice regarding functional limitations of an artificial joint.

Psychological factors:

Depression, anxiety, poor coping skills and a lack of social support can affect the outcome of TKR. Depressed patients tend to be less motivated to undergo rehabilitation after TKR which affects the final outcome of the surgery. It has also been shown that depressed patients fail to achieve adequate flexion. Pre-operative anxiety is a predictor of persistent pain 1 year after TKR. Patients with poor coping skills have greater difficulty adjusting to the event of
surgery and the postoperative restrictions and requirements with subsequently greater difficulty in recovery. Social support has been found to be related to the earlier achievement of rehabilitation tasks after a knee replacement (13).

Additional factors:

Preoperative OA grade is associated with variable satisfaction. TKR performed in patients with early osteoarthritis graded according to the Kellgren and Lawrence classification (Grades 1 and 2) are at a much higher risk of persistent pain and dissatisfaction after TKR (14, 15). In this setting, it is probable that the patients symptoms were the main driver to TKR and although there was a mismatch between symptoms and radiographs, the patients complaints held sway with an otherwise reluctant surgeon. However, the mismatch continues after surgery with there being symptoms in this patient group that more resilient patients would ignore.

The presence of co morbidities are related to a poorer outcome irrespective of the absence of associated complications. In particular, diabetes, pulmonary disease and concomitant back pain requiring oral narcotic medication are known independent predictors of dissatisfaction after TKR.

Clinical approach for evaluation of patients with unhappy TKR

Evaluate and rule out treatable complications

1. Clinical examination:
   - ROM
   - Stability
   - Alignment
   - Signs of infection

2. Imaging:
   - Radiographs: alignment, loosening, patellar tracking
   - Nuclear Scans: sepsis

3. Patient reported outcome measures (PROMS):
   - Oxford knee scores (OKS), SF-36

4. Psychosocial evaluation:
PCS, Becks depression inventory, Multidimensional health locus of control questionnaires.

References


