Patella dislocation following TKR, treated with arthroscopic lateral release, medial plication and Elmslie-Trillat tibial tubercle transfer.

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ABSTRACT: Patellofemoral complications following TKR are rather infrequent. We report a case of patella dislocation following TKR in a 53 year-old female who underwent TKR for an osteoarthritic knee in 15° of valgus. This was assessed arthroscopically and subsequently treated with a staged procedure. Arthroscopic lateral release was performed initially followed by medial plication; patellar tracking improved but was still suboptimal and therefore an Elmslie-Trillat tibial tubercle transfer was additionally undertaken. This led to very satisfactory patellar tracking and functional outcome. On 16-month follow-up the patient had satisfactory ROM, excellent patellar tracking and was back to full activities. This case highlights the diagnostic and therapeutic role of arthroscopy combined with a distal realignment procedure if necessary in the management of patellar instability following TKR.

Key Words: Patella dislocation, Total knee replacement, Elmslie-Trillat, Osteotomy.

INTRODUCTION
Patellofemoral complications have been reported to occur in 1-15% of cases following primary TKR, while the incidence of symptomatic patellar instability requiring surgical management ranges from 0.5 to 0.8%. Several factors are thought to be related with the occurrence of patellar instability, including component design, significant pre-operative valgus alignment, tibial or femoral component malalignment, soft tissue imbalance and postoperative trauma.

We report a case of patella dislocation following TKR in a 53 year-old female that was eventually treated with a stepwise procedure involving arthroscopic assessment of patellar tracking followed by arthroscopic lateral release, Elmslie-Trillat tibial tubercle transfer and medial plication. This case highlights the diagnostic and therapeutic role of arthroscopy combined with proximal as well as distal realignment procedures if needed in the management of symptomatic patellar instability following TKR.

CASE REPORT
A 53 year-old female patient underwent a TKR for primary osteoarthritis. Preoperatively her axial alignment was in 15° of valgus and her patella was significantly lateralised in extension, but would engage the trochlea in flexion (Figure 1a, 1b, 1c). A cemented PCL-substituting AGC total knee replacement (Biomet, Swindon, UK) was used and the patella was resurfaced. The femoral component was implanted in 3° of external rotation and at the end of the procedure, following tourniquet release, patellar tracking was assessed; it was felt that the patella was tracking satisfactorily and therefore a lateral release was not undertaken. Immediate post-operative x-rays were within normal limits as regards axial and patellar alignment. Although during the first postoperative months the

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The patient had a slow but steady improvement and she reached a ROM of 0-90°, she never felt that her knee was completely normal. Within the following months though, she started having increasing problems with knee pain and stiffness. On clinical examination 8 months postoperatively her patella was evidently laterally subluxated in extension and would dislocate with further flexion. This was shown in AP and lateral
x-rays and very clearly demonstrated with the skyline view (Figure 2a, 2b, 2c).

In view of her deteriorating symptoms, an arthroscopic assessment followed by an extensor mechanism realignment procedure was decided. Patellar tracking was evaluated under anaesthesia and subsequent arthroscopic assessment showed significant lateral patellar instability. Following that, a stepwise
**Figure 3a.** AP X-ray on final follow-up, 18 months post realignment procedure, showing good patellar alignment.

**Figure 3b.** Lateral X-ray on final follow-up, 18 months post realignment procedure: satisfactory osteotomy site healing.

**Figure 3c.** Skyline X-ray on final follow-up, 18 months post realignment procedure, showing satisfactory patellar alignment.
procedure was performed in order to improve patellar tracking. An arthroscopic lateral release was initially undertaken; patellar tracking improved but was still suboptimal and therefore an Elmslie-Trillat tibial tubercle transfer, followed by medial plication and vastus medialis advancement was undertaken. The Elmslie-Trillat tibial tubercle transfer was performed by medially displacing a 1x7 cm tibial crest fragment over a distal periosteal pedicle by 1 cm; fixation was achieved with 2 AO screws with washers. At the end of the procedure patellar tracking was reassessed arthroscopically and was very satisfactory through the full range of movement. Immediate passive flexion exercises were commenced and her knee was protected in an extension brace for a period of 6 weeks during which only partial weight-bearing was allowed. Active flexion and muscle strengthening exercises were started after the 6th postoperative week and full weight bearing commenced shortly after.

On 18-month follow-up she had a ROM of 0-90°, excellent patellar tracking, no pain or further incidences of instability and was back to full activities. X-rays showed very satisfactory patellar tracking and osteotomy site healing (Figure 3a, 3b, 3c). The overall functional outcome was very satisfactory; her Lysholm score improved from 48 to 93, her Tegner activity scale from 1 to 4 and the Activities of Daily Living Scale of the Knee Outcome Survey from 41 to 84.

**DISCUSSION**

Patellofemoral complications occur in as high as 15% of cases following primary TKR and include persisting patellofemoral pain, patellar subluxation or dislocation, component wear or failure, soft tissue impingement (patella clunk syndrome), osteonecrosis of the patella, patellar fracture and patellar tendon disruption. Failure to establish at the time of surgery proper alignment and tracking of the patella may result in residual patellofemoral pain, early component wear or failure and symptomatic patellar instability. Several factors have been related to the occurrence of patellar instability, including poor component design, significant pre-operative valgus alignment, axial or rotational component malalignment, soft tissue imbalance, medial retinacular tears and postoperative trauma.

Long-standing significant valgus deformity can cause severe imbalance of the extensor mechanism expressed as weakness or wasting of the vastus medialis, as hypertrophy or hypertonicity of the vastus lateralis, or as a combination of both. Component rotational malalignment on the other hand, namely either femoral or tibial component internal rotation or a combination of both, functionally raises the Q-angle, thus significantly increasing the valgus vector of forces applied on the patella and tends to subluxate or dislocate it laterally over the trochlear ridge. Rotational malalignment can be more accurately quantified by CT scan; component revision in more severe cases, or a distal bony realignment procedure in more subtle cases is thought to be the answer to this problem.

Distal bony realignment procedures have been employed with variable degrees of success for the management of patellar instability. Grace and Rand used a modification of Hauser’s procedure, transferring the patellar tendon with a thin wafer of bone. They report a high rate of complications, thus advising against it, but the fact that only a thin wafer of bone was transferred together with the patellar tendon might be responsible for the high failure rate. Kirk et al. on the other hand, report very satisfactory results using an Elmslie-Trillat tibial tubercle transfer for the management of recurrent patella dislocation following TKR with a Miller-Galante prosthesis, in which the tibial component has no stem. The presence of a stem in the tibial component renders the procedure far more demanding. To our knowledge only one case has been reported to date where a modification of an Elmslie-Trillat tibial tubercle transfer was used for the management of patellar instability in the presence of a stemmed implant.

In our case we believe that extensor mechanism disequilibrium due to longstanding substantial valgus deformity, combined with possible suboptimal rotational component alignment led to symptomatic patellar instability. A stepwise procedure was employed including arthroscopic assessment and lateral release combined with an Elmslie-Trillat tibial tubercle transfer and medial plication; during the procedure patellar tracking was under constant arthroscopic control. The resulting functional outcome was very satisfactory.
This case stresses the importance of accurate surgical technique in TKR and highlights the diagnostic and therapeutic role of arthroscopy in the management of symptomatic patellar instability following TKR. At the same time, a combination of soft tissue and bony realignment procedures might have to be employed if necessary in order to adequately address all the potential factors leading to patellar instability following TKR.

REFERENCES


