Acta Orthop. Belg., 2016, **82**, 17-22

ORIGINAL STUDY

Patella component loosening – A case report

E.M. Bloemheuvel, W.M.J. van Rooij, M. van den Besselaar

From Máxima Medisch Centrum, Eindhoven, The Netherlands

Patellofemoral arthroplasty is a treatment option for the relatively young patient with isolated patellofemoral osteoarthritis where conservative treatment has failed. However, despite of reasonable long term results, complications could be challenging. Loosening of the polyethylene patella component is a serious complication and has been reported in 2%. Dislocation of the polyethylene patella component did happen more often in the polyethylene patella metal backed LCS-PFA variant. In this case we describe the diagnostic and treatment challenges of this complication.

Keywords :

INTRODUCTION

Osteoarthritis can occur in three compartments of the knee. One of them is the patellofemoral compartment. Isolated patellofemoral osteoarthritis occurs in 8% of women and 2% of men older than 55 years (*2*). Patellofemoral osteoarthritis is characterized by anterior knee pain that typically worsens by stair or hill climbing, standing from a sitting position, kneeling or squatting. Walking on level ground is often unaffected. Some patients complain of crackling crepitus, stiffness of the knee or pseudolocking due to friction of the patella and the trochlear groove (*6*).

Total knee arthroplasty (TKA) with or without patella resurfacing is one of the most successful treatments of isolated patellofemoral osteoarthritis in older patients (*12*). The patellofemoral arthroplasty (PFA) could be a treatment option as well for isolated patellofemoral osteoarthritis in the relatively young patient with continuous pain who does not react on conservative treatment (non-steroidal anti-inflammatory drugs (NSAID), physical therapy and/or weight loss) (*8*). Because the condylar surfaces, menisci and cruciform ligaments are spared PFA is a more conservative approach than TKA. Maintaining more natural kinematics, proprioception and range of motion (*9*).

The advantages of a PFA over surgical alternatives like patellectomy or tibial tubercle osteotomy include the more predictable pain reduction and preservation of quadriceps muscle function.

Contra-indications described in literature are chondrocalcinosis, significant osteoarthritis in the medial or lateral tibiofemoral compartments, inflammatory joint disease, obesity and chronic anterior laxity. Some authors limit the procedure to patients less than 60 years although it is not evidence based (*10*).

■ E.M. Bloemheuvel, MSc.
■ W.M.J. van Rooij, MSc.
■ M. van den Besselaar, MD.
Máxima Medisch Centrum, Eindhoven, The Netherlands.
Correspondence : E.M. Bloemheuvel, Ds. Theodor Fliednerstraat 1, 5631 BM Eindhoven, The Netherlands.
E-mail : esther.bloemheuvel@gmail.com

No benefits or funds were received in support of this study.
The authors report no conflict of interests.

Fig. 1. — Radiograph demonstrating PFA anteroposterior view.

Fig. 2. — Radiograph demonstrating PFA lateral view

Good results of the PFA are published but complications like malpositioning, loosening of the components or maltracking can occur (*5,13*). In our case we encountered a young female patient with polyethylene component loosening from the metal patella component.

Case presentation

We have seen a 52 year old women at the orthopaedic outpatient clinic with locking sensations of the left knee during motion. She underwent a total hip arthroplasty (THA) on the right side one month before, but the pain in her knee interfered revalidation of the hip. In 2005 a patellofemoral arthroplasty was placed in her left knee (LCS-PFA, DePuy) because of isolated patellofemoral osteoarthritis.

Two months before THA she went to the emergency room after a minor trauma of the left knee with pain and hydrops. Radiography showed a normal position of the PFA, no patella alta, baja or fracture (Fig. 1 & 2). She went home with NSAID's.

Two weeks after THA she felt something 'clicking' in her knee. After that, the locking of the knee and hydrops developed. A MRI was made with the question meniscus rupture, but no abnormalities were seen besides hydrops. Though reviewing of the MRI was difficult because of the artifacts (Fig. 3).

Because locking sensations and hydrops persisted and the impaired function progressed in the left knee an arthroscopy was arranged. During arthroscopy large synovitis, tibiofemoral chondropathy (stage II-III) and detachment of the polyethylene (PE) patellacomponent from the PFA with wear was seen (Fig. 4 & 5). Afterwards we concluded that a new radiograph instead of a MRI would have given us enough information. The loose component was removed and we planned revision surgery.

Fig. 3. — MRI left knee demonstrating artifacts. Lateral view.

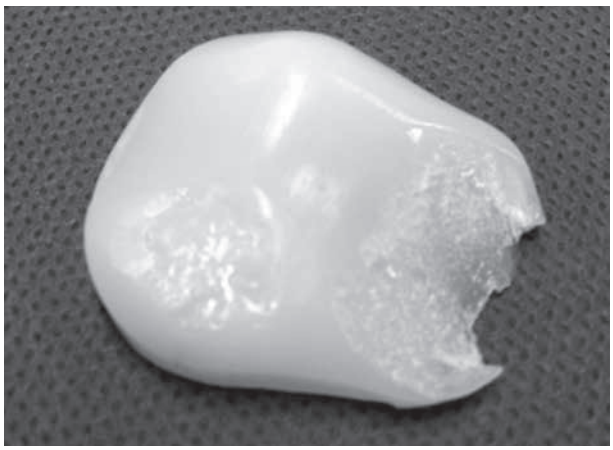

Fig. 4. — Photograph PE patella component demonstrating wear. Articulating side.

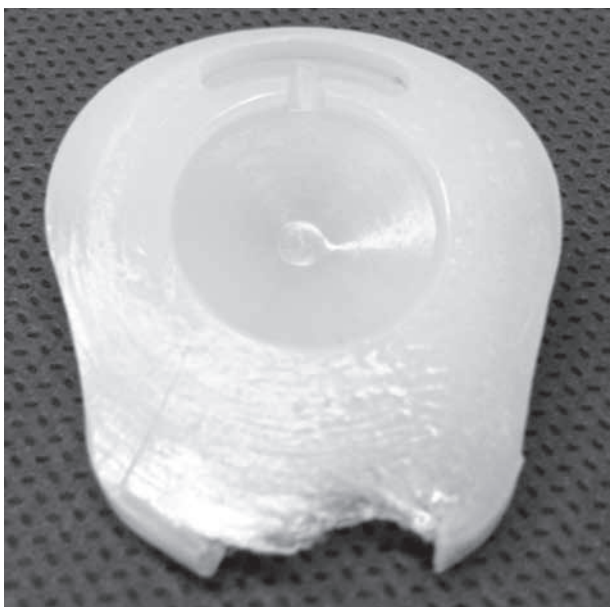

Fig. 5. — Photograph PE patella component demonstrating wear. Patellar side.

DISCUSSION

There are 2 important types of PFA. The first generation, introduced by Mac Keever in 1955, is a resurfacing arthroplasty which replaces the cartilage without significantly changing the subchondral bone. This arthroplasty was quickly abandoned since it caused wear of the trochlea. The second generation arthroplasty is based on the femoral trochlear cuts of a total knee arthroplasty, completely replacing the patellofemoral compartment of the knee. The second generation includes different kind of arthroplasty, especially the trochlear and patella components are variable (asymmetric, the degree of flexion or extension and shape of trochlear groove and shape of patella button) (*10*).

In our case a second generation LCS PFA (a Low Contact Stress Patellofemoral Arthroplasty, DePuy, Ortopaedics, Wasaw, Indiana) was placed. This implant exists of a PE patella component with a metal back (inlay) component, articulating with a metal trochlear implant (Fig. 6 + 7).

Early complications of PFA are besides infection, blood loss, thrombosis and nerve damage ; malpositioning, instability and bad patella tracking all caused by malalignment of the patella.

Late problems are loosening and/or wear of the components and development of tibiofemoral osteoarthritis (*13*).

Van Jongbergen *et al* (*5*) researched the long term-outcomes (30 year) of the PFA, n = 185. Thirteen percent got a TKA because of progressive development of tibiofemoral osteoarthritis after a

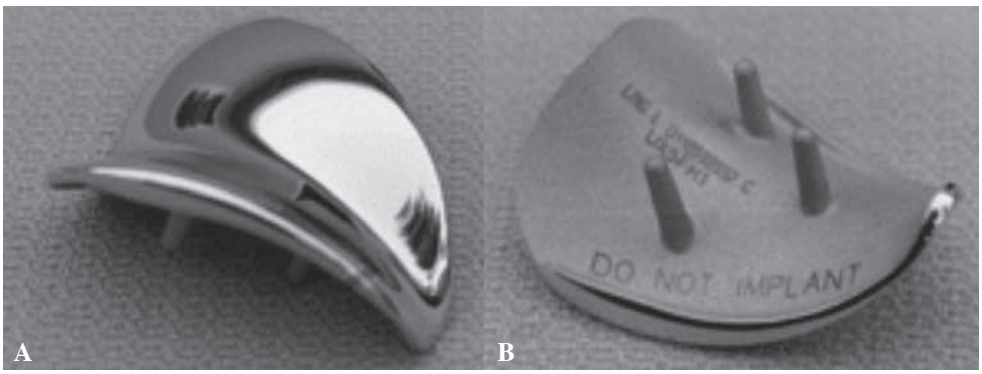

Fig. 6. — Photograph femur component. A : articulating side. B : Femur side (11)

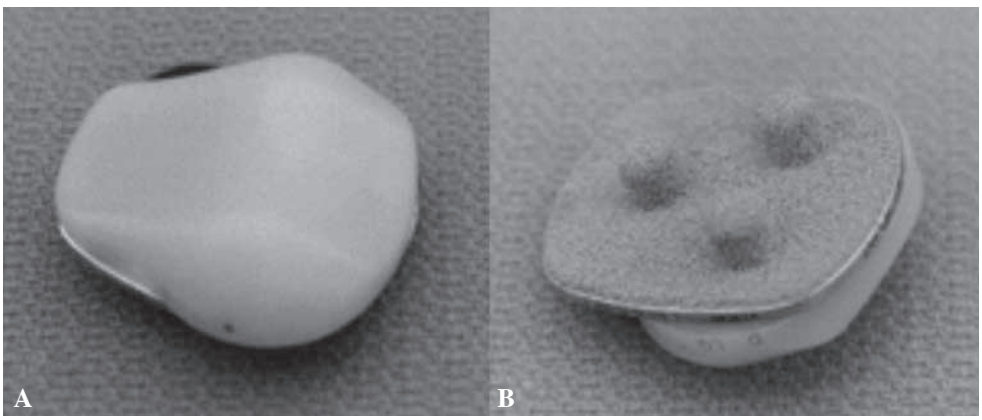

Fig. 7. — Photograph metal patella component with A : PE patella component articulating side. B : patellar side (11).

mean of 11.7 year. Malpositioning of the arthroplasty lead to revision in 6% after a mean of 2.2 years. Loosening of the patellar component was reported in 4 patients (2%) and these may be candidates for revision of PFA rather than conversion to TKA. Loosening of the trochlear component was not seen.

Possibilities for our patient were a revision of the total PFA, revision of the PE patella component alone or conversion to a TKA (*5*). Lonner *et al* (*9*) conclude good results in earlier research with conversion after 3 years and the results of the TKA are not influenced by the PFA (*7*).

Loosening of the PE patella component in the LCS-PFA has been described before (*1,14*), which is why the LCS-PFA got off market. Arumilli *et al* (*1*) reported a case from a patient with PFA on both sides. After 18 weeks the patient twisted the left knee and the PE patella component dislocated to suprapatellar (Fig. 8).

They revised the PE patella component first but after 2 years the right knee got painful. There was also loosening of the PE patella component and so they revised it to a TKA. After 3 years the PE component from the left patella was mobile again and they converted it to a TKA as well. They concluded that in first instance a new PE patella component seems to be the best solution. Though this will eventually lead to a TKA.

The residual thickness of the patella is the main problem when converting a LCS-PFA to a TKA. Because of the inlay metal back component a big part of the patella has to be resected. The metal back component has to be removed from the patella because otherwise it will be a metal-metal situation. When a metal patella component is removed with

Fig. 8. — Radiograph demonstrating disclocated PE patella component (suprapatellar). Lateral view (1).

adequate remaining patellar bone stock, an onlay-type all-polyethylene cemented implant can be used (*3*). Options for a deficient patella are cemented all-polyethylene biconvex patellar arthroplasty, patellar bone grafting and augmentation, patellar resection athroplasty (patelloplasty) or patellectomy. It is therefore described as an challenging situation (*3*). Garcia *et al* (*4*) did a retrospective research with 25 revised knees. The metal-backed patella component was removed either with an oscillating saw or an osteotome and revised to a cemented all-polyethylene patellar component. No patellar fractures were noted. The status of the remaining patella was indicating which revision patellar component should be done. For example thinner residual patellae were most commonly revised with a Genesis Biconvex from Smith and Nephew. One failure occurred but the total data confirmed a successful outcome.

Fig. 9. — Intraoperative photography showing PFA in situ with large metallosis.

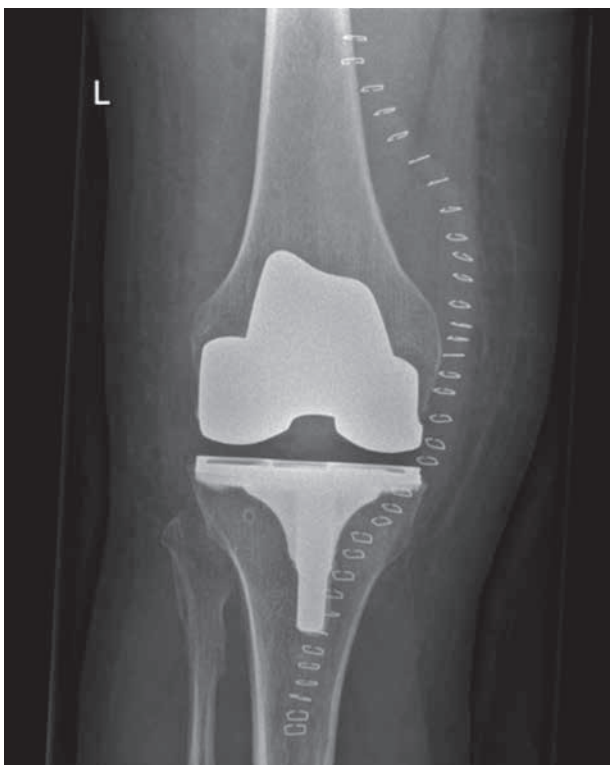

Fig. 10. — Direct postoperative radiograph demonstrating adequate position of the TKA with patellar component – anterio-posterior view.

After 3 weeks we revised the PFA to a TKA in our case and could remove the metal-backed patella component using a wire saw (Gigli®). The remaining

Fig. 11. — Direct postoperative radiograph demonstrating adequate position of the TKA with patellar component – lateral view.

patella thickness was 6 mm. Metallosis and large synovitis was present (Fig. 9).

After nettoyage and preparation of the patella a cemented PE patellar component (Genesis II Resurfacing patellar, Smith&Nephew) was implanted (Fig. 10 & 11). 3 days after surgery our patient went home with use of one crutch and a flexion-extension function of 70-0 degrees. After 6 weeks she shows an active extension deficit of 5 degrees with a normal walking and cycling gait.

Retrospectively in this case, an additional MRI and arthroscopy could have been prevented if we did a radiograph before.

REFERENCES

1. **Arumilli BRB, Ng ABY, Ellis AB *et al.*** Unusual mechanical complications of unicompartmental low contact stress mobile bearing patellofemoral arthroplasty : a cause for concern ? *Knee* 2010 ; 17 : 362-364.
2. **Davies AP, Vince AS, Shepstone L *et al.*** The radiologic prevalence of patellofemoral osteoarthritis. *Clin Orthop Relat Res* 2002 ; 402 : 206-212.
3. **Garcia RM, Kraay MJ, Conroy-Smith PA *et al.*** Management of the Deficiënt Patella in Revision Total Knee Arthroplasty. *Clin Orthop Relat Res* 2008 ; 466 : 2790-2797.
4. **Garcia RM, Kraay MJ, Goldberg VM.** Isolated All-polyethylene Patellar Revisions for Metal-backed Patellar Failure. *Clin Orthop Relat Res* 2008 ; 466 : 2784-2789.
5. **van Jonbergen HP, Werkman DM, Barnaart LF *et al.*** Long-term outcomes of patellofemoral arthroplasty. *J Arthroplasty* 2010 ; 25 : 1066-1071.
6. **Kim YM, Joo YB.** Patellofemoral osteoarthritis. *Knee Surgery & Related Research* 2012 ; 24 : 193-200.
7. **Leadbetter WB, Kolisek FR, Levitt RL *et al.*** Patellofemoral arthroplasty : a multi-centre study with minimum 2-year follow-up. *Int Orthop* 2009 ; 33 : 1597-1601.
8. **Leadbetter WB, Ragland PS, Mont MA.** The appropriate use of patellofemoral arthroplasty : an analysis of reported indications, contraindications, and failures. *Clin Orthop Relat Res* 2005 ; 436 : 91-99.
9. **Lonner JH, Jasko JG, Booth RE.** Revision of a failed patellofemoral arthroplasty to a total knee arthroplasty. *J Bone Joint Surg [Am]* 2006 ; 11 : 2337-2342.
10. **Lustig S, Magnussen RA, Dahm DL *et al.*** Patellofemoral arthroplasty, where are we today ? *Knee Surg Sports Traumatol Arthrosc* 2012 ; 20 : 1216-1226.
11. **Merchant AC, Alain C.** Early results with a total patellofemoral joint replacement arthroplasty prosthesis. *J Arthoplasty* 2004 ; 19 : 829-836.
12. **Smith AJ, Wood DJ, Li MG.** Total knee replacement with and without patellar resurfacing : a prospective, randomised trial using the profix total knee system. *J Bone Surg [Br]* 2008 ; 90 : 43-49.
13. **Walker T, Perkinson B, Mihalko WM.** Patellofemoral Arthroplasty : The Other Unicompartmental Knee Replacement. *J Bone Joint Surg [Am]* 2012 ; 19 : 1713-1720.
14. **Witjes S, van den Broek C, Koëter S *et al.*** Dislocation Of The Mobile Bearing Component Of A Patellofemoral Arthroplasty : A Report Of Two Cases. *Acta Orthop Belgica* 2009 ; 75 : 411-416.