Patello-femoral arthroplasty: indication, Surgical technique and results

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Introduction

Isolated osteoarthritis of the patello-femoral joint can be a cause of severe anterior knee pain and may limit daily activities such as standing up from a chair or climbing stairs. Although physical therapy and other non-operative methods have a role in the treatment, surgery may be required in patients with persistent knee pain and several surgical options have been proposed. These include debridement of the patella-femoral joint, elevation of the
anterior tibial tubercle, spongialization of the patella, prosthetic resurfacing of the patella alone, or patellectomy. Total knee arthroplasty (TKA) has also been reported for patients with arthritis confined to the patella-femoral joint.

Patello-femoral arthroplasty (PFA), defined as resurfacing both sides of the patella-femoral joint, has been proposed as a treatment option. There have been several studies published on PFA during the past 25 years and the reported results at mid-term follow-ups are variable with favorable results ranging from 72% to 85%. With the new generation of implants, better short-terms results have been reported and a regain of interest can be observed for PFA. In fact, the trochlear components have evolved from inlay-style to onlay-style designs, which have reduced the incidence of patellar instability, maltracking and pain. It was our hypothesis that PFA can be a valuable option for isolated patello-femoral arthritis of the knee. We aimed in this paper to: 1) Define the indication, 2) Describe the surgical technique and 3) Present the results of PFA.

1. Indications

There is no limited criteria concerning age or gender or even weight for PFA as it can be a bone sparing solution for younger patient with bone on bone arthritis of the PF joint, or a less invasive solution for older patients.

Three main indications of PFA are classically described:

a. **Isolated patella-femoral arthritis:**
   - Isolated bone on bone arthritis of the PF joint is a very good indication.
   - Any varus misalignment or early medial arthritis should be carefully evaluated as one of the main reasons for revision of the PFA is the progression of arthritis in the medial compartment.

b. **Arthritis post-dysplasia:**
This indication represents according to the results of the literature the ideal indication for PFA.

Lateral facet bone on bone arthritis consecutive to a long-lasting history of mal-tracking of the extensor mechanism can be effectively treated with a PFA with less risk of arthritis progression in the other compartments.

c. Post-traumatic arthritis:

- Isolated post-traumatic arthritis of the PFA is also a good indication particularly in young patients.

- Pre-operative evaluation should however eliminate any post-traumatic patella-infera or any patellar non-union following transversal fractures that may lead to extensor mechanism weakness. In fact, the PFA may be efficient on the pain but the function (in terms of range of motion and strength) will not be restored.

d. Others indications:

- PFA can be a good option in case of bi-compartmental arthritis

e. Contra-indications:

- Painful patella-femoral syndrome particularly for patients with a long history of pain and multiples surgeries.
- Patella baja
- Insufficient ACL/PCL
- Rhumatoid arthritis, chondrocalcinosis or any systemic inflammatory disease

2. Surgical technique:

Key point: if the patella is the train and the trochlea the rails: the goal is to bring back the rails under the train, in another word increase the external rotation of the trochlear implant and lateralized.
• Choose a second generation implant: an on-lay implant with an anterior cut and not an in-lay implant based on resurfacing of the trochlea
• Prefer a tourniquet less technique to control the tracking intra-operatively
• Any approach can be performed: we recommend the sub-vastus approach
• Mark the Whiteside line as a landmark to set the rotation
• Performed the anterior cut first
• If it’s a central PF arthritis: restore the actual rotation
• If it’s an arthritis of the lateral facet: lateral rotation should be at least 10°
• Choose the smallest implant possible
• Lateralized your implant as much as possible
• Use a cemented implant
• Resurface the patella
• Full weight-bearing and range of motion is allowed immediately post-operatively.

3. Results

a. Understand the causes of failures

• **Patellar maltracking:** related to the early generation of implants, the so-called resurfacing implants.

• **Progression of arthritis in the medial compartment:** one of the most frequent cause of revision even with the new generation of implants

• **Pain, stiffness, instability:** related to surgical technique or implant type

• **Loosening of cementless implants**
b. Long-term results with an old generation of implants

In our experience, with the early generation of implants, the cumulative survival rate for the all group, including the 9 patients died of unrelated causes, was 58% at 16 years (95% confidence intervals). These results are in accordance with the results observed in the literature.

c. Mid and short term results with the new generation of implants

High functional scores and survivorship have been observed with the new generation of implants. In our experience, with an implant introduced in 2008, the survivorship is so far 100% with a great improvement in terms of function.

It’s important to notice that a medial unicompartimental arthroplasty is frequently used in association with the PFA, as a so-called un-linked bi-compartmental arthroplasty.

d. Revision of a PFA to a TKA

Our results indicate that revising a PFA is more similar to a primary in regards to surgical characteristics and postoperative clinical outcomes. The majority of patients can be revised to a TKA with a standard implant.

Conclusion

References

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