

Patellofemoral Arthroplasty in the Athlete



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KEYWORDS

• Patellofemoral • Arthroplasty • Athlete • Sports participation recommendations

KEY POINTS

- Despite an increasing number of patient athletes undergoing patellofemoral arthroplasty (PFA) for isolated/end-stage arthritis, no postoperative sports participation recommendations exist.
- Patients undergoing PFA can be divided into the 3 groups with overlapping disease characteristics: those with patellofemoral dysplasia, traumatic arthritis, and a predisposition for arthritis in the patellofemoral joint.
- Current PFA techniques and implants are related to decreased implant failure and improved clinical outcomes.
- High impact sports may lead to an increase in catastrophic failure and polyethylene wear.
- The benefits of maintaining an active lifestyle are well documented and can be realized even after PFA.
- Lower-impact sports, such as golf, swimming, doubles tennis, and skiing, are acceptable activities after PFA.

INTRODUCTION

Workplace, societal, and governmental policy changes since the mid-20th century have led to more free time, more athletic options beginning at early ages, more female participation in sports, and increasing obesity. Patellofemoral arthritis is multifactorial and is more prevalent in women and in those with high patellofemoral loading (eg, from athletics and obesity).^{1,2} As a result, more patients are presenting with end-stage patellofemoral arthritis at earlier ages, which is increasingly being treated with patellofemoral arthroplasty (PFA).³ However, these patients often desire to continue with some level

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of sporting activities. The goal of the surgeon is to allow the highest postoperative activity level, with safety being paramount. Unfortunately, current guidelines for sports participation after arthroplasty are based primarily on literature for total joint arthroplasty, which is largely derived from laboratory findings and level 5 evidence.⁴

THE PATIENT

Selecting the appropriate patient for PFA begins with documenting whether the patellofemoral arthritis is both isolated and end-stage. Patellofemoral arthritis is not uncommon. Prevalence data suggest that 10% to 20% of patients who are candidates for arthroplasty have isolated patellofemoral degenerative joint disease.⁵ This group comprises 3 patient types with overlapping disease characteristics: those with (1) patellofemoral dysplasia, often associated with a remote history of instability; (2) posttraumatic arthritis; and (3) normal anatomy with a probable genetic predisposition for degenerative joint disease first presenting at the patellofemoral compartment.⁶ Those with recurrent instability often stop participating in sports for fear of patella instability events, whereas those with posttraumatic arthritis and/or a genetic predisposition for arthritis have gradually decreased their sporting activities as their arthritic symptoms have increased.

Once the patellofemoral pain is resolved postoperatively, many patients want to resume their preoperative sporting activity. Some may even want to start new, higher-level activities now that pain is not a limitation.⁷ Based on the published activity recommendations for partial and total knee arthroplasty, beginning a new skilled sport (involving unfamiliar technique, direction change and complex form) after arthroplasty is not advisable.⁴

THE IMPLANT

Patellofemoral arthroplasty has been available almost as long as total knee arthroplasty (TKA). Just as with TKA, initial problems occurred, not only with component design but also with component materials. First-generation PFAs had problems with both wear and patellar stability, but surprisingly, not with mechanical loosening.⁸ Second- and now third-generation PFA implants have addressed these initial issues and are associated with improved clinical outcomes.^{9,10} Most current patellar implants are all-polyethylene components with multiple pegs that are either dome- or oval dome-shaped. The polyethylene is highly durable and not metal-backed, which leads to very low wear and loosening rates. The trochlear components match the radius of curvature of the patellar component in the axial plane and are typically based on anthropomorphic "normal" trochleas for the sagittal profile. With multiple peg fixation typical also on the femoral component, these components also have excellent fixation and low loosening rates.¹⁰⁻¹³ These changes in design have undoubtedly improved patient outcomes. It has even been suggested that the most common mode of failure of PFA is tibiofemoral arthritis.¹⁴

THE PATELLOFEMORAL PREPARATION

Minimally invasive surgery (MIS) had brief popularity in knee arthroplasty surgery. For PFA, the goal never focused on MIS per se, but rather bone-sparing surgery. All third-generation PFAs have trochlear components that remove minimal bone from the femur and allow (easy) conversion to a primary TKA.¹⁵ The patellar bone preparation is similar to that for TKA. Because the patients are often younger (especially in the subset desiring increased sport activities), the goal is to preserve as much bone stock as possible to allow future revisions and avoid (potential) patellar fractures.¹⁶ The

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