

Pushing the boundaries? Challenges and ethical considerations for hip and knee joint arthroplasty in elite athletes

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As the world of elite-level sports continues to evolve in parallel with the evolution of medicine, new and sometimes unexpected challenges keep arising. The duration of sports careers has increased along with life expectancy, as well as with sport training and competition loads. Sports activities may lead to a higher risk of severe osteoarthritis (OA) in young patients due to discipline-specific factors such as high velocity/impact, frequent pivoting or repetitive joint loading.¹ Therefore, specific medical attention and sometimes major surgical interventions such as total joint arthroplasty may be required in particular cases. Initially designed to improve quality of life during later decades of life, joint replacement surgery has been one of the most important medical achievements of the late 20th century. With many motivated young athletes pushing the limits to resume sports after surgery, the growing surgical expertise for minimally invasive procedures, and the evolution of implants, there is a trend for patients to undergo arthroplasty surgery at an increasingly younger age.²

In elite athletes, the risk of developing end-stage OA and undergoing arthroplasty is higher than the general population,

often at an earlier age.^{1,3} Reports about the return to elite-level sports after joint replacement are scarce. A case series reported that elite athletes were able to resume sports activity at a professional level following hip resurfacing arthroplasty, across a wide range of high-impact sports like tennis, soccer, track & field, and long-distance running.⁴ That series followed individual examples reported by the public press (eg, Andy Murray in tennis, Quentin Robinot in table tennis and Floyd Landis in cycling), thus receiving high media attention. It could be foreseen that sports medicine practitioners and orthopaedic surgeons will increasingly be faced by younger patients of various athletic levels expressing the desire to undergo hip or knee arthroplasty to continue their athletic careers at the highest possible level.

ARTHROPLASTY TO PRESERVE THE OLYMPIC DREAM?

Medical counselling and therapeutic decision-making are difficult in young patients considering total joint arthroplasty for whom sports is a major determinant of their life, be it for socioeconomic reasons or psychosocial well-being.⁵ Should a former Olympic athlete be cleared to participate in his or her final Olympic Games with a hip or knee arthroplasty? Should a young and promising potential Olympic athlete with end-stage hip or knee OA in the beginning of his/her 20s be recommended to undergo arthroplasty surgery to be able to pursue the Olympic dream? Should we recommend arthroplasty surgery to a former athlete in his/her early 30s with an arthritic joint experiencing no symptoms during activities of daily life, but who is unable to participate in sports competitions because of joint pain? In the past, the answer to these three scenarios would have been a clear and definitive 'No'. Patient-athletes would have been counselled to stop their career, refrain from their Olympic

dreams, reduce their joint load to avoid or decrease their symptoms and undergo non-operative treatment or opt for joint preserving surgery. But in recent years, orthopaedic surgery has made an evolution through greater recognition of patient autonomy and shared decision-making approach in which the answer to these three scenarios could be 'Yes'. But would this be a wise decision?

UNDERSTANDING THE RISKS OF EARLY ARTHROPLASTY

Thus far, no evidence exists regarding the medium-term or long-term outcomes of early arthroplasty in elite-level athletes, nor on specific recommendations for a continuous pre-retirement and post-retirement follow-up in this population. Although the short-term outcomes may seem encouraging in some sports, healthcare professionals must remain cautious about generalising access to such procedures in young and active elite-level athletes. Potential problems related to surface wear and loosening may be increased by sports practice⁶ and lead to early revision surgeries with increased risk of associated surgical complications. Likewise, a severe traumatic event could cause some important (and even limb or life-threatening) conditions like periprosthetic fractures, implant dislocations or severe lesions of the knee extensor mechanism after knee arthroplasty, leaving no viable options to preserve joint function.

Performing an arthroplasty in such young athletes with the unique goal to return to elite-level sports with high joint loading leads to a higher risk for early revision surgery and limited life expectancy of the arthroplasty (figure 1). Thus, caution is recommended to perform arthroplasty in young patients for the sole purpose of extending an athletic career, if the patient can perform activities of daily living with minimal symptom burden.

GUIDELINES ARE ABSENT: A CALL TO ACTION

There are currently no clear recommendations or guidelines from scientific and professional societies for elite-level athletes to which coaches and sports organisations could refer. Individual surgeons' recommendations after total hip or knee arthroplasty are indeed highly diverse both in terms of sports type and intensity.^{2,7} Decision-making should thus be well balanced and respond to the highest clinical and ethical standards.⁸ Beyond the healthcare aspects, psychological factors, economic-oriented and

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