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Unicompartmental knee replacement – Current perspectives

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ABSTRACT

Unicompartmental knee replacement (UKR) is an effective treatment for end-stage, symptomatic unicompartmental osteoarthritis of the knee. However, certain aspects of the procedure are still debated. These areas of discussion include patient selection criteria, implant design and the discrepancy in survival rates between national registries and independent case series. These may contribute in limiting the more widespread acceptance of unicompartmental knee replacement.

The aim of this paper is to review the up-to-date evidence on UKR and discuss the most relevant controversies regarding this procedure.

1. Introduction

Unicompartmental knee replacement (UKR) is an effective treatment for end-stage, symptomatic osteoarthritis (OA) of the knee that is limited to a single compartment. Despite growing evidence in its favour, many surgeons still consider UKR as a niche option for a limited number of patients. It has been estimated that worldwide only 10% of orthopaedic surgeons perform unicompartmental knee replacements. This number is surprisingly low considering the potential efficacy and safety of a minimally invasive procedure that could be offered to a larger proportion of patients requiring knee replacement surgery. The indications for UKR play an important role in generating these controversies, alongside the discrepancy in clinical results reported in National Joint Registries and case series from high volume centres.

The aim of this paper is to review the up-to-date evidence on medial UKR and discuss the most relevant controversies concerning this procedure.

2. Historical overview

McKeever and MacIntosh first proposed the theory of UKR in the 1950s, with the introduction of a metallic component that was used to replace the tibial surface.[1] The results of these procedures were unsatisfactory, with a high incidence of complications and poor functional results.

The first modern unicompartmental designs, the “St. Georg” and the “Marmor Knee”, were introduced in 1969 and 1972, respectively.[2] Both presented a polyradial metallic femoral component and a flat tibial component made of polyethylene. Initially, the results were controversial. Wear and polyethylene deformation were the biggest problems, which led to the introduction of metal-backed tibial component.[3] In the 1970s and 1980s, the understanding of OA as a pathology of the entire joint and the rising interest in total knee replacement led to a fervent development of these implants. In contrast, UKRs had limited innovation, such that some implants still in use remain almost unchanged.[4]

In the late 1980s, Goodfellow, Tibrewal et al. believed that some of the disappointments in previous attempts at UKR had arisen from inadequacies in prosthetic design, poor patient selection, and surgical techniques.[5] The authors discussed the theoretical requirements of a successful UKR and presented their preliminary results using the Oxford meniscal components in a unicompartmental mode in 25 knees. It is worth noting that in 1976 Goodfellow & O'Connor had initially proposed the use of a meniscal bearing design of knee prosthesis and implanted these for bicompartmental tibiofemoral arthroplasty from 1978. Over the years, many of these issues have been addressed with refinements in prosthetic designs and UKR is widely accepted as a valid procedure in the treatment of unicompartmental osteoarthritis of the knee (Figs. 1 and 2).

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Fig. 1. Preoperative weight-bearing radiographs showing bone-on-bone AMOA. The presence of osteophytes in the lateral compartment is not a contraindication for UKR using the Oxford criteria.

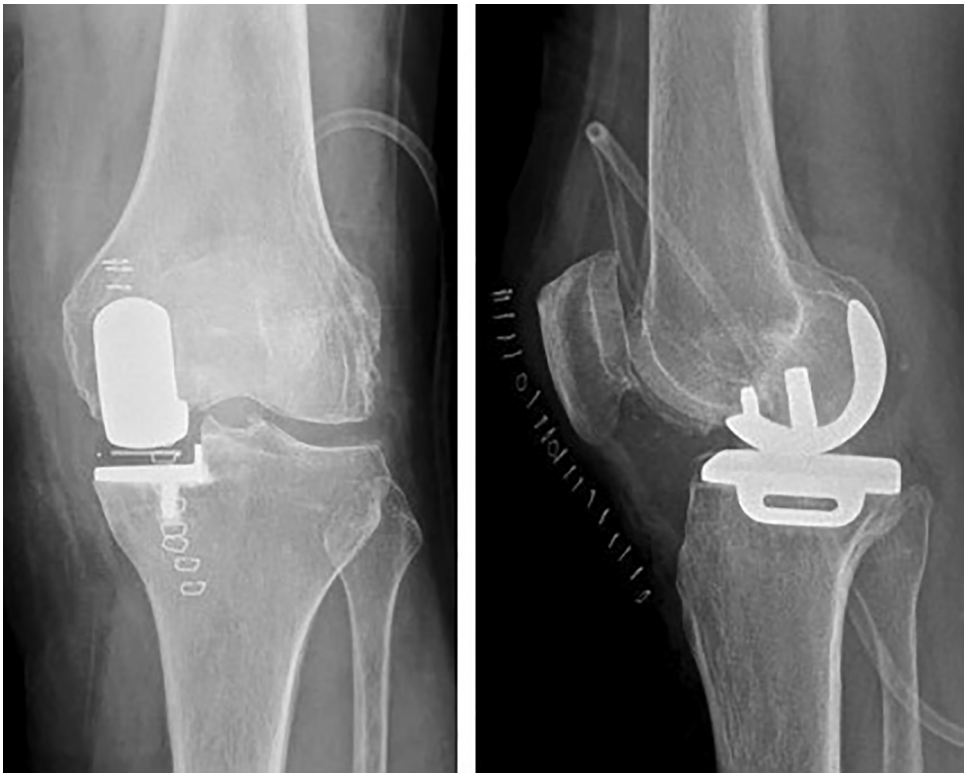

Fig. 2. Immediate post-operative radiographs showing a mobile-bearing UKR. The joint line in re-established with full thickness cartilage in the lateral compartment.

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