

# Metallic hemiarthroplasty of the knee

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## Purpose of review

This review discusses the advantages and disadvantages of metallic hemiarthroplasty.

## Recent findings

Metallic hemiarthroplasty may continue to have a very selective limited role in the treatment of unicompartmental osteoarthritis. Fewer than 1% of patients with osteoarthritis should be appropriate candidates. The indications might include a young osteoarthritic patient with unicompartmental arthritis in whom an osteotomy is contraindicated but who is considered too young, heavy, and/or active for total knee arthroplasty.

## Summary

The advantages of metallic hemiarthroplasty include the conservative nature of the operation and permission for the patients to engage in activity to tolerance. Disadvantages are the possibility of incomplete pain relief and that the procedure is technically demanding and sensitive.

## Keywords

metallic hemiarthroplasty, knee arthroplasty

## Introduction

Surgical options for the treatment of unicompartmental osteoarthritis include osteotomy, unicompartmental arthroplasty, and total knee arthroplasty (TKA) [3]. Osteotomy is favored in young, heavy, and active patients, especially men, whose opposite compartment is free of significant disease. Unicompartmental metal-to-plastic arthroplasty is recommended for older or more sedentary patients as a conservative procedure that spares both cruciate ligaments and preserves bone stock for future revision [5,6,12]. TKA is often favored over unicompartmental arthroplasty in elderly patients because revision is less likely in the second postoperative decade for the patient who has fewer than two full decades of life expectancy [1].

A fourth alternative, metallic hemiarthroplasty, was introduced in the 1950s by MacIntosh and McKeever (MacIntosh and McKeever prostheses, Howmedica, Inc. Rutherford, NJ) (Fig. 1) with limited popularity [7,8]. This alternative was all but forgotten until recently, when the concept was reintroduced with a prosthetic device called the UniSpacer (Centerpulse Inc., Austin, TX) (Fig. 2) [11].

## Past experience

Both MacIntosh and McKeever published their early experience in the late 1950s [7,8]. MacIntosh [7] reported good initial results in 72 of 103 knees with a minimum 6-month follow-up. McKeever [8], with a slightly different prosthesis, claimed good initial results in 39 of 40 knees. Potter *et al.* [9] followed up 19 knees in patients with osteoarthritis who had either a McKeever or MacIntosh prosthesis for an average of 3 years (range 1–9 years) and reported good to excellent results in 17 of the 19 knees.

The most recent reports of metallic hemiarthroplasty were both published in 1985. Scott *et al.* [10] reported on 40 patients with 44 unicompartmental McKeever arthroplasties followed up for 5 to 13 years (average 8 years). At final follow-up, 70% of the knees were rated as being in good or excellent condition. Also in 1985, Emerson and Potter [2] published the results of 61 unicompartmental McKeever arthroplasties in patients monitored for 2 to 13 years (average 5 years), with a similar proportion (72%) rated as good or excellent.

Despite these results, metallic hemiarthroplasty never became popular, possibly because of the advent of cemented metal-to-plastic TKA with its higher initial and long-term results.

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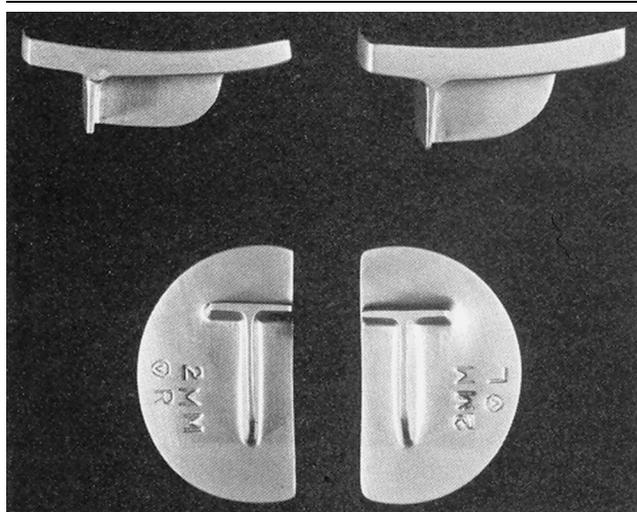
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## Abbreviation

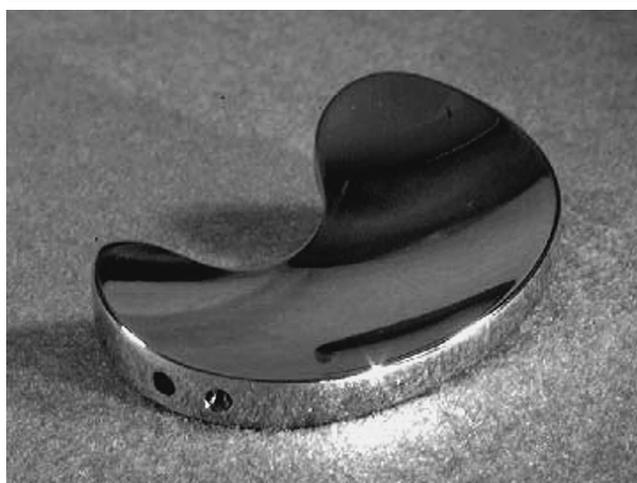
TKA total knee arthroplasty

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**Figure 1. McKeever metallic hemiarthroplasty**

### Current role of metallic hemiarthroplasty

Certain patients, however, may still qualify for metallic unicompartmental hemiarthroplasty as an alternative to high tibial osteotomy, metal-to-plastic unicompartmental arthroplasty, or TKA. The indications include a young osteoarthritic patient with unicompartmental arthritis of either the medial or the lateral side in whom an osteotomy is contraindicated by early opposite compartment disease or poor range of motion and who is considered too young, heavy, or active for TKA. It is estimated that approximately 1% of osteoarthritic patients would be candidates. Another relative indication involves a patient with a history of sepsis at the knee joint because of the minimally invasive nature of metallic hemiarthroplasty.

**Figure 2. Unispacer metallic hemiarthroplasty****Figure 3. Patient 11 years after bilateral McKeever procedure**

The patient plays ice hockey two times a week.

The senior author has continued to use McKeever hemiarthroplasty for highly selected patients during the past three decades. An unpublished series of 24 knees in patients younger than 60 years has shown that excellent clinical results can be long lasting and allow a high level of activity. After 10 years, some patients have continued to participate in activities such as downhill skiing and competitive ice hockey (Fig. 3). At an average of 14 years of follow-up, half the knees are still *in situ* with Knee Society knee scores averaging 93 and function scores averaging 98 [4]. The longest successful result is observed 28 years after implantation.

### The UniSpacer

The UniSpacer can be thought of as a “mobile” McKeever or MacIntosh hemiarthroplasty. [11] Instead of an attempt at fixation to the tibial plateau *via* a keel or roughened undersurface, it is designed to translate freely on the tibial plateau as determined by the conforming articulation of its top surface with the femoral condyle. This mobility makes it inappropriate for use in the lateral compartment, where the femoral rollback could cause prosthetic dislocation and/or soft tissue impingement.

In the only published report to date of which we are aware, Hallock [3] in 2003 reported on 71 knees in 67 patients with a minimum 1 year of follow-up [3]. Five patients (7%) had undergone revision to TKA, and an additional 10 (14%) had their UniSpacer exchanged for either dislocation (6) or pain (4). The overall 1-year revision rate, therefore, was 21%. Among the 66 knees that retained a UniSpacer, the average flexion was 117°, with an average knee score of 78 and a function score of 72. Additionally, 17 patients (24%) had arthrofibrosis requiring manipulation under anesthesia for

flexion ranging from 60° to 100°. The authors maintain that this problem has decreased by beginning early range of motion exercises rather than imposing 2 weeks of immobilization, as had been the initial protocol.

These results seem to be inferior to those published for McKeever hemiarthroplasty by Scott *et al.* [10], except for a slighter higher flexion arc of 117° in contrast to 110°. The revision rate was 50% higher for the UniSpacer at 1 year (21%) than for the McKeever at 8 years (14%). It must be conceded, however, that the UniSpacer does have the advantage of possible insertion through a minimally invasive approach, whereas the McKeever arthroplasty demands a larger exposure for contouring the femur and tibia and for insertion of the prosthesis.

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