

# Preface

It was 1987, and the orthopedic world was still coming to terms with a steady stream of long-term failures of metal on polyethylene total hip arthroplasties. Although Hans Georg Willert had published his theory that polyethylene wear-induced osteolysis was the most likely cause of these failures, the debate was still on—many still believed it to be cement disease, intraarticular pressure, or some other unknown cause. Having completed my orthopedic training, I decided to work on a fellowship for a year before taking up a position as an orthopedic consultant. One of the projects I undertook during my fellowship was to review the 10- to 20-year outcomes of Charnley hip replacements that had been performed at the Royal Orthopaedic Hospital in Birmingham since 1966. During my fellowship, I also carried out a large number of revision procedures, and it was clear that revision arthroplasty was going to form a major part of my work over the coming years. During that year, I had the privilege of spending time with Prof. Hans Bucholz and Dr. Eckart Engelbrecht at the Endo-Klinik in Hamburg, with Drs. John Insall and Chit Ranawat at the Hospital for Special Surgery in New York, and with Dr. Bill Harris in Boston learning new techniques in primary and revision arthroplasty.

Toward the end of that year, I was appointed as a consultant to the Royal Orthopaedic Hospital, Birmingham, the oldest orthopedic speciality hospital in the United Kingdom, and wasted no time building up a busy revision joint arthroplasty service. I had to deal not only with in-house referrals but also received a considerable number of difficult cases from colleagues in the West Midlands region covering a population of more than 5 million people. I became adept at techniques such as cementless reconstruction of the deficient acetabulum and reconstruction of the very deficient femur.

Of course, I was also seeing a large number of elderly patients, predominately women, with excellent clinical and radiographic outcomes many years after their Charnley flat back stemmed total hip replacements. However, my revision hip clinics were populated by a completely different group of patients who were in general younger, more active, and predominately men. Furthermore, in this younger population, I was being referred an increasing number of patients for their second, third, or fourth hip revision operations, with each revision operation having failed in a shorter time than did the previous total hip replacement. I started to come to the view that what was a good hip arthroplasty for an elderly, inactive patient would not necessarily be good for a younger, more active patient.

I had been introduced to the concept of hip resurfacing during my orthopedic training, having assisted a number of my senior colleagues with the Wagner hip resurfacing prosthesis. As the new arthroplasty surgeon, I revised many of those patients as well with disappointingly early failures. My own observations from those revision operations and the work of others confirmed that the mode of failure in these resurfacings, where a metal or ceramic head had been articulating on a conventional polyethylene acetabular component, was osteolysis from large volumes of polyethylene debris. It was obvious that Sir John Charnley was spot on when he encouraged joint replacement surgeons to use a small-diameter femoral head on polyethylene total hip replacement in order to reduce the volume of polyethylene debris generated.

Follow-up of another group of patients, however, in my outpatient clinics was particularly revealing with respect to femoral head size. Seven of my senior colleagues at the Royal Orthopaedic Hospital had performed three different varieties of large-headed metal on metal total hip replacements. These patients did not get bearing-related osteolysis at long-term follow-up. It became clear to me that if resurfacing arthroplasty was to be resurrected, then a practical alternative available at the time would be to use a large-headed metal on metal articulation in the resurfacing arthroplasty. Although metal on metal total hip replacements and metal on polyethylene surface replacements had been used at the Royal Orthopaedic Hospital before, both operations had now been abandoned. This was also the situation in most joint replacement centers across the world. Hence, I knew that I had a difficult task; the challenge of combining

these two failed systems into what I believed held the clue to a successful arthroplasty procedure and to convince others that we could successfully work toward that goal.

I approached Dr. Ian Brown, managing director of Zimmer Ltd (Swindon, UK), during 1988, and we began discussing how to develop a metal on metal surface replacement for the hip. He had experience of manufacture of metal on metal bearings in the past and was well disposed to the metal on metal resurfacing concept, but after a year, during which time we had an outline of the femoral and the acetabular component design characteristics, Zimmer UK required permission from their parent company in the United States before they could proceed with the project. Zimmer appointed one of their lead surgeon designers from the United States to adjudicate on this matter, and he flatly turned the idea down on the grounds that “surgeons are just not asking for that type of replacement.”

I then approached a number of other orthopedic manufacturers who dismissed the idea of a metal on metal surface replacement as insane. Eventually, I was introduced to Mr. Peter Gibson, chairman of Corin Medical Ltd (Cirencester, UK). To my surprise, he had an excellent grasp of the benefits of putting metal on metal and resurfacing arthroplasty concepts together and soon convened a meeting. It was attended by Mr. Mike Tuke, managing director of Finsbury Instruments Ltd (Leatherhead, UK), who had experience in the past of manufacturing the Freeman hip resurfacing; Mr. George Cremore, manufacturing director of Corin Medical Ltd, who had had experience of supervising the manufacture of thousands of metal on metal joint replacements as a young man; Mr. Gibson himself; and me.

At the first meeting, we agreed to proceed with the project, but in order to reduce development cost, they believed that they could start with only one component size. However, I managed to talk them out of that and insisted on having three component sizes available. They wished to use the cobalt chrome castings from the Freeman SLF cup, which they already manufactured, and Mr. Michael Freeman kindly gave permission for his design of cup to be used as the acetabular component for my first resurfacing.

By February 1991, we were ready for the first implantation. Quite unbeknown to me, Prof. Heinz Wagner had been having similar thoughts, and he, too, inserted his first metal on metal hip resurfacing design in February 1991. I had previously visited Heinz Wagner and knew him to be a supreme technical surgeon and from our discussions at meetings respected him as a thoughtful innovator in the field of joint reconstruction. I took great comfort as a young consultant at that time, knowing that there was at least one other surgeon on the same wavelength. I encountered massive opposition from my surgical colleagues both in the United Kingdom and abroad to the idea of a metal on metal resurfacing in subsequent years, and the support from Heinz Wagner kept me going in the teeth of vicious criticism.

This book is an account of my experience with hip resurfacing, starting with the lessons learned from failures of the Wagner polyethylene-containing resurfacings, the challenges we faced solving the issue of fixation of components in the early years, the problems with manufacturing and metallurgy we inadvertently encountered, the solutions to those problems, and finally the development of the Birmingham Hip Resurfacing. My colleagues and I describe herein the Birmingham Hip Resurfacing from concept to 10 years of experience including a major section on surgical technique. This book is an effort to educate orthopedic surgeons on the lessons we learned in an attempt to prevent unnecessary failures for patients in the future.

Derek J.W. McMinn  
Birmingham, UK  
August 2007

<http://www.springer.com/978-1-84800-087-2>

Modern Hip Resurfacing

McMinn, D.J.W. (Ed.)

2009, XVI, 432 p. 698 illus., 566 illus. in color.,

Hardcover

ISBN: 978-1-84800-087-2