

Late disassembly of modular acetabular components

A report of two cases

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We report two cases of late disassembly of modular acetabular components, 4 and 5 years after implantation. One was revised immediately after the disassembly and one after 4 months, the latter demonstrating excessive wear of metal and polyethylene.

Radiographs showing eccentric displacement of the femoral head in the cup associated with a dark, curved shadow representing the displaced polyethylene insert identify this type of implant failure.

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Implant failure related to the acetabular component is a rare cause of failure. 5 cases of fracture of the polyethylene cup (Harley and Boston 1985), 3 cases of disassembly of a modular acetabular component 5, 26 and 120 days after operation (Ferenz 1988, Bueche et al. 1989, Kitziger et al. 1990) and disassembly of a one-piece metal-backed acetabular component (Beaver et al. 1991) have been reported.

Case 1

In February 1987, a total hip arthroplasty was performed for primary arthrosis in a 51-year-old man. The femoral component used was a cemented straight-stem Müller prosthesis with a ceramic head and the acetabular component an uncemented 54-mm Harris-Galante cup, a modular component with a porous-coated titanium socket fixed with screws and a polyethylene insert.

Postoperative radiographs were satisfactory, the patient was rapidly mobilized and after 3 weeks he returned to his work as a stadium manager. Though his occupation was physically demanding he managed this, and a high level of activity in his spare time as well, without any restrictions and without any symptoms from the hip at all for the next 54 months.

August, 1991, he felt what he described as a distortion of the hip followed by pain. He suddenly had a limp, and the hip produced a loud squeaking sound. Radiographs the same day showed an eccentric displacement of the femoral head in the cup (Figure 1). Fracture of the ceramic head or of the polyethylene insert was suspected and revision was performed the next day.

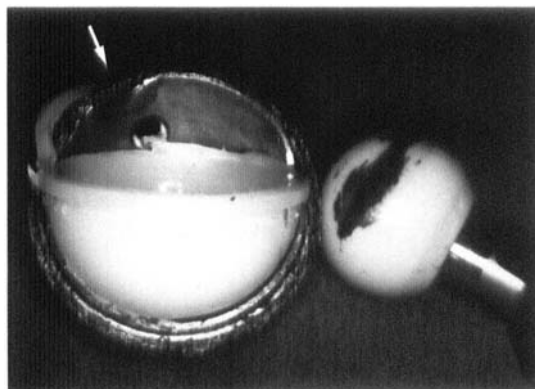
There was a fracture of the proximal part of the rim of the insert, which was tilted out of the metal socket and rotated 90 degrees. The femoral head was located in the metal socket, and the titanium was burnished in a 10 × 10 mm area in the proximal part, but there were no signs of metal debris or metallosis. Both the femoral component and the acetabular socket were stable. It was not possible to fit a new insert in the metal socket as the flanges were distorted; it was removed without any loss of bone and a new one implanted. The femoral head was exchanged. The postoperative period was uneventful and the patient went back to work after 6 weeks. Reevaluation of the prerevision radiographs revealed that the displaced polyethylene insert could be identified as a dark curved shadow distal to the metal backing (Figure 1).

Case 2

In January 1988, a total hip arthroplasty was performed for traumatic necrosis of the femoral head in a 69-year-old woman. A cemented straight-stem Müller femoral component with a ceramic head and an uncemented 50-mm Harris-Galante acetabular component were implanted.

Postoperative radiographs were satisfactory, but mobilization was complicated by a moderate peroneal palsy. However, after rehabilitation the patient was discharged to her own home, where she managed until she 2 years later sustained a cerebral vascular insult, which required care in a nursing home. The operated on hip was pain-free until April 1991. From then on, without relation to any known trauma or other well defined event, she complained of pain in the hip. The

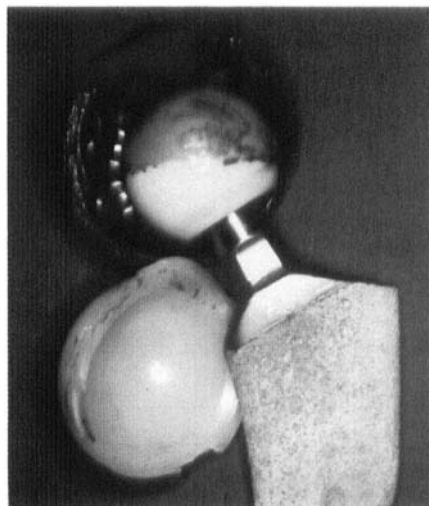
Case 1.



Retrieved acetabular components. Burnished area on the metal backing is marked with arrow.

Prerevision. The curved shadow represents the displaced polyethylene insert (arrow).

Case 2.



Retrieved acetabular components.

Prerevision. The curved shadow represents the displaced polyethylene insert (arrow).

pain increased and walking ability deteriorated gradually until she 4 months later was admitted to our department. She now suffered severe pain, accentuated with every movement of the hip, and she was bedridden. Radiographs showed eccentric displacement of the femoral head in the cup and, based on our experience from the previously reported case, we noticed the dark curved shadow indicating dislocation of the polyethylene insert (Figure 2).

At revision we found excessive metallosis of the soft tissues. The rim of the insert was fractured and the insert tilted out of the metal socket and rotated 90 degrees. The femoral head was located in the socket, of which 20 percent at the proximal part was totally eroded away. The underlying bone was necrotic and stained black by titanium debris. The displaced polyethylene insert was worn by the neck of the femoral component.

The remainder of the socket was fixed to bone, but it was removed without difficulty together with necrotic bone; debridement of affected soft tissues was performed. A new socket was implanted in cement, and the femoral head was exchanged.

Unfortunately, the patient sustained recurrent dislocations after the revision and another revision was needed with exchange of the insert to a hooded liner. She later had another dislocation, and a resection arthroplasty is being considered.

Discussion

Since 1984, 1100 Harris-Galante cups have been implanted in our department. The two cases reported represent two very different categories of patients, one a relatively young male with a high level of physical activity and the other an elderly female with severely impaired function due to intercurrent disease.

Lack of correct initial fit of the insert in the socket might cause dislocation of the insert as pointed out by Star et al. (1992), who reported 3 cases of dissociation of modular components associated with reduction of dislocated arthroplasties; however, the long intervals to failure of 4 and 5 years suggest that this cannot be the cause of failure in our cases.

We believe that the failures of the acetabular components were initiated by wear of the polyethylene insert leading to fracture of the rim, allowing disassembly of the component, but we cannot sufficiently explain why this should happen in these two very different patients.

We also believe that the slight marks of wear on the metal backing in case 1, revised the day after the failure, represent the starting point of a process of wear leading to the extreme destruction of the component eventually found in case 2. It should be noticed that this destruction occurred even though the patient was almost totally immobilized.

In any case of sudden change in the clinical presentation of a total hip arthroplasty, radiographs should be obtained immediately. Eccentric displacement of the femoral head in the cup, associated with the presence of a curved dark shadow representing the displaced polyethylene insert, indicate the presence of this type of implant failure. Revision should be performed immediately because of the risk of excessive wear of the metal socket.

Beaver et al. (1991) suggested that only modular components should be used in total hip arthroplasty, so that it would not be necessary to remove a metal backing well fixed through bony ingrowth in case of failure of the polyethylene insert. This was clearly not a safe

solution in our cases as the snap-fit mechanism was distorted, preventing insertion of a new polyethylene liner.

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