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Long-term follow up of Charnley total hip arthroplasty (THA)

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Of a total of 256 patients operated with primary Charnley total hip arthroplasty (THA), 186 patients (216 hips) were followed up by examination after 5-9 (mean 6.8) years.

All operations were carried out in an operation box with ultraclean air. Prophylactic antibiotics were not given routinely. The lateral approach with trochanteric osteotomy was used in all cases.

Eight hips (3.7 per cent) were revised during the period of observation. Four of these (1.9 per cent of the total number of hips) were infected, resulting in removal of the prosthesis and cement (resection hip). The other four were aseptic loosening, leading to prosthetic exchange.

At follow-up we used Charnley's modification of d'Aubigné & Postel's hip score. Scores of 5 or 6 were found in 91.5 per cent regarding pain, 66.1 per cent referring to walking ability, and 75.9 per cent looking at the range of movement (the four resection hips excluded).

Radiologic signs of suspected or definite prosthetic loosening, including radiolucent zones exceeding 2 mm, cortical hypertrophy, cement fracture, or migration of components, were seen in 12.3 per cent of the examined hips. However, $\frac{3}{4}$ of these patients had pain scores of 5 or 6. $\frac{1}{4}$ of the radiologic loosening concerned the acetabular cup, whereas both components were loose in $\frac{1}{6}$ of the cases.

There were no significant differences between the hips with or without radiologic loosening with respect to the position of the stem (varus, neutral or valgus).

Non-union of the trochanteric osteotomies was detected in seven hips.

Complications, their management, and recent advances in the Charnley low friction arthroplasty

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Three basic problems require further surgical intervention - dislocation, infection and loosening of components (including fracture of the stem).

A review of 14 672 LFAs carried out between November 1962 and June 1979 revealed 92 dislocations (0.63 per cent). Only 16 (0.11 per cent) required revision surgery. The causes of dislocation were: loss of the abductor mechanism, shortening of the limb and malorientation of components.

In 9825 LFAs carried out between 1965 and 1975 and reviewed in 1982, the deep infection rate was 0.52 per cent. The patients at risk were males with post-operative urinary infection, diabetics, patients with psoriasis and rheumatoid arthritis. In the same group of patients the revision for loosening of the socket was 0.52 per cent and 0.42 per cent for loosening of the stem.

Fracture of the obsolete flat back stem occurred in 1.59 per cent.

In the management of failed cases early revision was advocated. A set of revision instruments being used at surgery were shown, pointing out various aspects of the procedure: the exposure and the removal of the components and of the acrylic cement.

The new advances included a dome-shaped trochanteric osteotomy cut with a Gigli saw and its fixation with a compression spring, a new method of preparation of the acetabulum and socket fixation

using the Charnley Ogee flanged socket, and stem fixation using the intramedullary bone block technique, which has almost completely eliminated even the radiologic loosening of the stem.

Charnley's LFA in complete congenital dislocation of the hip

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A short survey of the literature was given. The problems related to the special pathologic anatomy of completely dislocated hips and indications for surgery were discussed.

In six completely dislocated hips, the acetabular cup was implanted at the original site of the acetabulum with reconstruction of gluteal function and lengthening of the extremity, according to the principle of Harris, W. H. (1974). (Total hip replacement for congenital dysplasia of hip: Technique. *The hip. Proceedings of the Second Scientific Meeting of the Hip Society*, pp. 251–264. C. V. Mosby, St. Louis.) Charnley's prosthesis specially designed for "small" hips was used in all cases. No postoperative complications were noted. The short-term results were excellent in all cases.

It is concluded that Charnley's specially designed prosthetic components are suitable for this kind of surgery, but careful preoperative planning is deemed necessary as regards the size of the femoral medullary canal and amount of bone stock at the site of the original acetabulum.

Our experience with the Mittelmeier cementless total hip prosthesis

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First, a short comparison was made between the cemented and uncemented THP. Results with most cemented THP are good for the first months and years after the operation. However, a high percentage of them loosen after some years, with the cement probably being the critical factor in the loosening. Accordingly, the cementless prosthesis may be better, especially if the patient is young or middle-aged with a long life expectancy.

With his first 1000 patients, Prof. Mittelmeier had about 75 per cent excellent or good results. Harms

had more than 90 per cent good results with his first 223 patients, using the Mittelmeier cementless THP.

We started using the Mittelmeier THP in 1980. In all, we have inserted 51, of which 48 have been reviewed and examined. The observation time was from 8 to 39 months. The mean age of the patients was 49 (27–69) years. There were 20 excellent results, and 16 fair (fair means an improvement, but some pain is present still). Twelve have poor results: they have pain, and six of them have already been reoperated.

The failures are probably due to technical errors. It is important that the cup is at a 45 degrees angle, and that the femoral stem is in valgus and is hammered firmly down in the femur.

Physiotherapy must be careful in some respects. During the first 6 weeks, 20 kg weight bearing is allowed on the operated leg, increasing to the full weight after another 6 weeks.

Christiansen and Brunswik prostheses in total hip arthroplasty – long-term results with regard to aseptic loosening and revision

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In total hip arthroplasties, the Christiansen prosthesis was used from 1975 through 1979 and the Brunswik prosthesis from 1973 through 1981. A review of the cases in 1980 included 124 Christiansen prostheses and 129 Brunswik prostheses. Aseptic loosening requiring revision surgery occurred in 19 Christiansen and three Brunswik hips.

In the remaining cases, 48 per cent of the Christiansen and 39 per cent of the Brunswik hips showed radiologic loosening.

At follow-up in July of 1983, there was a total of 498 Christiansen and 365 Brunswik prostheses. The revisions for mechanical failures were 17.7 per cent (88 hips) and 4.7 per cent (17 hips), respectively, a difference which was statistically significant ($p < 0.001$). Among the 88 loose Christiansen prostheses, two out of three were confined to the acetabular part.

During revision surgery, the Christiansen hips showed marked synovitis with large quantities of debris and often signs of excessive socket wear. We believe that the wear products from the Christiansen Delrin socket cause foreign body reactions, secondarily causing aseptic loosening. Consequently, in cases of isolated loosening, we exchanged the Delrin socket only for one of polyethylene.

Measurement of wear in Christiansen acetabular cups

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Thirty Christiansen total hip prostheses were removed because of mechanical loosening after being used for 3–11 (mean 5.5) years. The patients, aged 44–80 (mean 68) years weighed 45–90 (mean 68) kg. In the Delrin 150 (polyacetal) acetabular cups, the motion/pressure of the head against the prosthesis had made an excentric defect. This defect was measured by making a silicone rubber cast of it. The volume, corresponding to wear/creep, measured 140 mm³ to 2010 mm³, mean 1020 mm³. The penetration of the caput through the wall of the cup was 0.1 to 2.1 mm, mean 1.0 mm. In two additional cups the penetration was right through the wall of the cup. There was no correlation between wear/creep and years of use, age or weight of patients.

Suprcondylar fracture of the humerus in children

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Fifty children (34 boys and 16 girls), with ages varying from 1 to 15 years, were treated for a supracondylar fracture of the humerus in 1977–1980. Forty-two injuries resulted from play or fall, and only four from traffic accidents. The dislocation of the fracture was minor (Grade 1–2) in 19 cases and major (Grade 3–4) in 31 cases. In six cases, other injuries were present in the same limb.

A primary reductive and balanced traction using a wing screw in the olecranon was instituted in general anaesthesia. The average duration of traction was 3 weeks.

Two patients were operated on primarily for a vascular injury. Later, three patients were operated on for unsatisfactory closed reduction.

At the follow-up 3–24 months post-injury, a reduced carrying angle but no varus was found in seven patients. One patient had an increase of valgus of 5°. One patient without vascular injury developed Volkmann's contracture and was operated on by muscle release with good result.

We conclude that closed reduction and traction is a safe treatment with early detection of most complications and with good late results. Its drawback is the long hospitalization period.