

COMPLICATIONS FOLLOWING OSTEOTOMY OF THE GREATER TROCHANTER IN TOTAL HIP REPLACEMENT ARTHROPLASTY USING THE LATERAL APPROACH

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In a consecutive series of 365 hip replacement arthroplasties *ad modum* Charnley in 309 patients migration of the trochanteric fragment was encountered in 4.9 per cent of the cases.

The predisposing factors were wire-breakage, trochanteric fractures and excessive weight. Men were more apt than women to develop migration. Early mobilization with weight-bearing on the operated leg did not increase the risk of migration.

The migration rarely gave rise to complaints, and if so only mild ones.

Trochanteric union did not pose problems, and at the end of 2 years 98 per cent had united. After 5 years no case of non-union was detected.

Key words: migration of the greater trochanter; postoperative complications; total hip replacement arthroplasty; trochanteric osteotomy

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Hip surgery is performed using various approaches, each having its advantages and disadvantages.

In hip replacement arthroplasty one method is the lateral approach with osteotomy of the greater trochanter and wide excision of the hip joint capsule. This approach affords ideal exposure and facilitates insertion of the acetabular as well as the femoral component of the prosthesis (Charnley 1972, Mallory 1974). A disadvantage of this method is reported to be poor union of the greater trochanter, pain, and gluteal insufficiency (Charnley & Ferreira 1964, Weaver 1973, Amstutz & Maki 1978, Harris & Crothers 1978). In the anterolateral and posterolateral approaches trochanteric osteotomy is avoided, but the exposure is poorer, thus increasing the risk of a non-optimal positioning of the acetabular component (Lewinnek et al. 1978, Wiesmann et al. 1978).

Our experiences of the lateral approach with

osteotomy of the greater trochanter are reported below.

PATIENTS AND METHODS

The material comprises the first 365 arthroplasties performed in Department O, Odense University Hospital, on 309 patients, 138 males and 171 females. The median age was 61 years, range 26–78 years. The operations were carried out during the period November 1968 to June 1975. The technique was that recommended by Charnley with the modifications introduced by him.

In reattaching the greater trochanter three different methods of fixation were employed. In 157 it was done by one wire drilled vertically and one horizontally through the lesser trochanter (Figure 1). Sixty-five were fixed with a double wire vertically and one horizontally through the lesser trochanter (Figure 2). In 143 the fixation was by a double vertical and one horizontal wire passed under the lesser trochanter (Figure 3).

When reattached, the greater trochanter was placed in the anatomical position in 84 cases, and distally

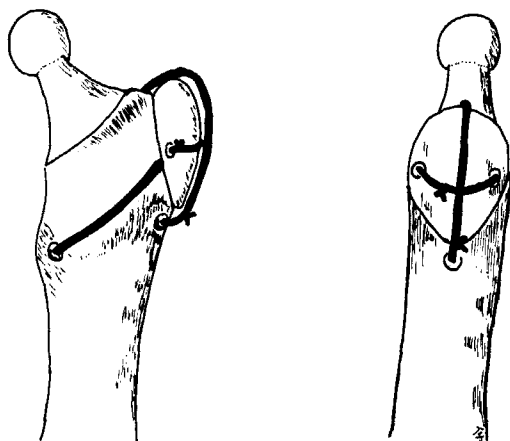


Figure 1. Wiring technique using one wire drilled vertically and one wire drilled horizontally through the lesser trochanter.

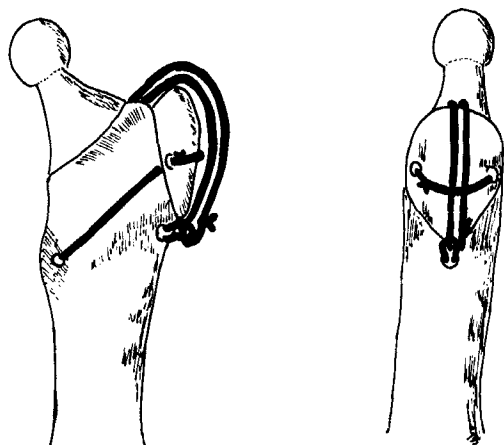


Figure 2. Wiring technique using a double wire drilled vertically and one wire drilled horizontally through the lesser trochanter.

shifted to counteract gluteal insufficiency in 281 cases. In the latter group the greater trochanter was roughened and fastened at the distal edge of the osteotomy.

During the period under study two principles of mobilization were used. The first 164 patients were mobilized from the 7th postoperative day without weight-bearing on the operated leg for 12 weeks. In the case of the remaining 201 patients a more active principle was applied. These patients were mobilized from the 2nd postoperative day, with gradually increasing weight-bearing on the operated leg.

In the course of the period preoperative selection was introduced. In the first few years excessive weight was not recognised as a problem and therefore 133 patients

with overweight problems were submitted to operation. Since 1974 overweight patients have not been allowed operation until their weight has been sufficiently reduced, i.e. to normal weight plus a maximum of 10 per cent.

RESULTS

The study was based upon clinical evaluation, including X-rays of the hip, peroperatively and also 3, 24 and 60 months postoperatively, and the available X-rays numbered 365, 365, 319 and 138, respectively.

Union of the greater trochanter was assessed in relation to the wiring technique used, and it was found that union of the trochanteric fragment was independent of the wiring technique. After 3 months, union had occurred in 96, 98, and 98 per cent and in 2 years union had occurred in 99, 98 and 98 per cent according to the wiring technique used (Figures 1, 2 and 3). At the end of 5 years there was no non-union. In no case was re-operation needed because of deficient union.

The follow-up disclosed 24 cases of migration. In six of these the migration was less than 5 mm, and the greater trochanter had united within 3 months, so that these cases will be left out of the analysis. Among the remaining 18 (4.9 per cent), 10 had migration of 5–10 mm, 6 migration of 10–15 mm and 2 migration more than 15 mm.

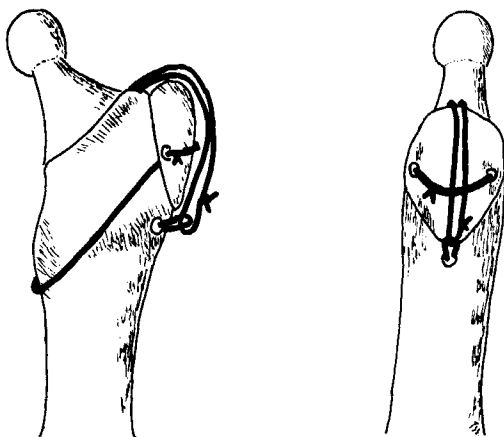


Figure 3. Wiring technique using a double wire drilled vertically and one wire passed horizontally under the lesser trochanter.

The sex ratio among the patients with migration revealed a significant male preponderance ($P < 0.05$), viz. 13 of the 174 male hips as against 5 of the 191 female hips.

As regards the wiring technique, the study showed that it had no influence upon the tendency to migration. It was also investigated whether migration was correlated with wire-breakage, trochanteric fractures, osteoporosis and excessive weight, as compared with non-migration. Table 1 shows a correlation with wire-breakage, trochanteric fracture, and overweight problems, significant for all three factors ($P < 0.05$).

A suspicion that early mobilization with weight-bearing might increase the number of cases with migration was not confirmed, as migration occurred in 7 out of 164 patients mobilized slowly without weight-bearing and among 11 out of 201 patients with early mobilization and weight-bearing.

Normal anatomical reattachment of the greater trochanter was followed by migration in 2 out of 84 patients, whereas distal shifting of the trochanter entailed migration in 16 out of 281 patients. In 12 of the latter cases the end result was union distal to the normal anatomical position.

In 6 cases the greater trochanter migrated proximally, and in 5 of these the end result was union 1–10 mm proximal to the normal anatomical position, with a good functional result in all cases. In one case the greater trochanter migrated 43 mm proximal to the normal anatomical position, and there were no signs of union at the end of 2 years. Nevertheless, the functional result was good, the patient being free of pain and having an almost normal walking ability.

The migration did not give rise to any special therapeutic measures in 16 cases, while in the remaining two cases the patients were kept in bed for 2–3 months. There were no re-operations.

During the follow-up period no dislocation of the femoral component or femoral fracture occurred.

Postoperatively the functional result in the patients with migration was evaluated as regards pain, walking ability, and range of motion, according to Charnley (1972).

Table 1. Occurrence of wire-breakage, trochanteric fracture, osteoporosis, and overweight in patients with and without migration, evaluated 3 months postoperatively

	18 patients with migration	347 patients without migration
Wire breakage	4	5
Trochanteric fracture	3	5
Osteoporosis	3	29
Overweight	11	122

Table 2. Eighteen cases of migration evaluated 2 years postoperatively according to Charnley (1972)

Charnley score	Pain	Walking ability	Range of motion
6	16	14	2
5	—	1	10
4	2	2	6
3	—	1	—
1–2	—	—	—

From Table 2 it is apparent that migration did not give rise to major complaints 2 years after the operation, about 90 per cent of the patients being free of pain, and 78 per cent having normal walking ability, and these results do not differ from those in the material as a whole.

DISCUSSION

The lateral approach to the hip joint with osteotomy of the greater trochanter in hip-replacement arthroplasty has been criticized by several authors. It has been pointed out that this method can give rise to complaints due to non-union of the greater trochanter and migration, resulting in pain and compromised walking ability (Weaver 1973, Amstutz & Maki 1978, Wiesman et al. 1978).

In our study we focused on these problems. Provided that the greater trochanter had been sufficiently tightly attached, the wiring technique proved to be of minor importance. We used three wiring techniques, and could not show any differ-

ence as regards union rate and migration rate. Problems of union were negligible, as more than 98 per cent had united in 2 years and all in 5 years.

Migration was a minor problem. The incidence of migration was 4.9 per cent, corresponding to the figures given by Amstutz & Maki (1978). As a rule, the migration was minimal, less than 10 mm, and it did not give rise to major complaints in any case. It was found that men were significantly more apt than women to develop migration. The reason for this might be that men generally are heavier and more active physically.

Overweight problems, wire-breakage, and trochanteric fracture also increased the risk of migration significantly, which was no surprise. It was surprising, however, that early mobilization with weight-bearing on the operated leg did not increase the risk of migration compared with mobilization without weight-bearing for 3 months.

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