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TROCHANTER FIXATION WITH THE DUTCHMAN'S HOOK

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For nearly 30 years we have been using a special hook for reattachment of the trochanter. Its use has been evaluated in 80 hip replacements. Non-union was seen in one case. Loss of trochanteric position occurred in 9% of the hips. Trochanteric bursitis was a frequent complication (10%) and six patients had the hooks removed on that account.

Key words: hip arthroplasty; osteotomy; greater trochanter

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In 1952 Prof. Dr. J. D. Mulder, former director of the Orthopaedic Department "Anna Kliniek" in Leiden, designed a special hook for reattachment of the greater trochanter following osteotomy. His method of trochanter fixation has since been used in this department. The purpose of this study is to evaluate our method of trochanter fixation.

The Dutchman's hook is 5.4 cm long (Figure 1). Initially the material of the hook was stainless steel, but we are now using a vitallium hook. It has two curved sharp-pointed ends. The proximal end can be placed in or over the greater trochanter. The trochanter is pulled down and the distal end is tapped into the cortical bone of the femur. The hook is fixed with a screw. Depending on the size of the trochanter the screw either fixes the trochanter and crosses the osteotomy or is situated distal to the osteotomized trochanter. When one hook is used, some rotational displacement is still possible and another hook or screw with washer is necessary to fix the trochanter securely (Figure 2).

PATIENTS AND METHODS

The charts of all patients who had had replacement arthroplasty of the femoral head or the femoral head and neck since 1952 were reviewed. From these charts, patients who had had a trochanteric osteotomy and a minimum follow-up of 1 year were chosen for this study. This screening produced a group of 77 patients (three bilateral) with 80 trochanteric osteotomies. Two patients were excluded because the roentgenograms had been lost. All trochanters had been reattached with Dutchman's hooks.

After surgery the patients were kept in balanced suspension for 3 weeks before weightbearing was started.

Fifteen trochanters were reattached with one hook, 10 with one hook and one screw, 50 with two hooks, and 5 with three hooks.

The group consisted of 34 patients with replacement of the femoral head (Judet prosthesis), 19 with replacement of the femoral head and neck (Eicher prosthesis), 14 (2 bilateral) with surface replacement (Gérard type) and 10 (1 bilateral) with revision of a failed total hip prosthesis.

The diagnoses were: osteoarthritis in 45, avascular necrosis in 17, pseudarthrosis after hip fracture in 2, collagen disease in 5, revisions in 11 cases.

The clinical records and roentgenograms were evaluated with special attention to the following criteria:

- Time of healing.
- Loss of trochanteric position.
- Trochanteric bursitis.
- Reoperation related to trochanteric problems.
- Trochanteric fragmentation.

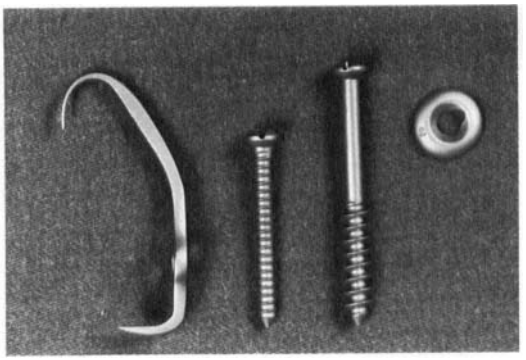

Figure 1. Dutchman's hook with screw.

Figure 2. An X-ray after double cup arthroplasty. Trochanter fixation with two hooks.

RESULTS

Time of healing

In 65 hips, trochanteric osteotomy healing occurred within 3 months of surgery. For six hips there were no roentgenograms 3 months after surgery; the roentgenograms immediately after surgery and 1 month and 6 months after surgery showed no loss of trochanteric position and good healing at 6 months. These were not considered to be instances of delayed union (defined as no healing at 3 months) in view of a normal roentgenogram at 1 month and complete healing at 6 months.

Eight hips showed delayed union. In all these cases there was a complication, e.g. trochanteric displacement or trochanteric fragmentation. They will be discussed later.

One hip showed complete detachment of the trochanter and at 1 year there was still no trochanteric healing. This was the only non-union in our series.

Loss of trochanteric position

In seven hips, loss of trochanteric position was noted on the roentgenogram 1 month after surgery.

In two hips this failure was clearly due to a technical error. In one case (revision of a failed total hip prosthesis), the trochanter was reattached with one hook. The hook was fixed with a small screw, which crossed only one cortex and did not penetrate the cement. On the post-operative roentgenogram the trochanter and hook were completely detached from the femur, with a gap of 10 mm. No union had occurred 1 year after surgery.

In the second case two hooks were used. The proximal ends of the hooks were not properly placed and did not penetrate the trochanter. On the roentgenogram 3 weeks after surgery, the trochanter had slipped proximally over a distance of 25 mm. A trochanteric gap was not seen and bony union occurred at 3 months. One year after surgery, trochanteric reconstruction was necessary for weakness of abduction.

In two hips, where the trochanter was reattached with only one hook, the trochanter seemed to have rotated upwards on the roentgenogram 1 month after surgery. The proximal migration was less than 2 mm, and healing occurred 6 months after surgery.

In three hips, proximal migration of the trochanter was seen on the roentgenogram 1 month after surgery. The distance of migration was 10, 8 and 5 mm, respectively. Nevertheless the fixation in all cases seemed to be technically

good. The osteotomy healed at 1 year, 6 months and 4 months after surgery, respectively.

Trochanteric fragmentation

In three hips, fragmentation of the trochanter occurred in the first weeks after surgery. The proximal migration of the fragments was minimal in two hips. In one hip the proximal migration was 5 mm. The osteotomies healed in 6 months, 6 months and 1 year, respectively.

Trochanteric bursitis

Trochanteric bursitis was noted in eight hips. Six patients had persistent pain and underwent removal of the hooks 1–2 years after surgery, with subsequent relief of pain.

DISCUSSION

There is still some controversy concerning routine osteotomy of the trochanter in total hip replacement. In revision surgery and with severely deformed hips, osteotomy of the trochanter improves exposure and facilitates cementing and component placement. In our department we do not routinely perform osteotomy in total hip replacement.

In surface replacement the lateral approach according to Watson-Jones gives insufficient exposure for reaming the femoral head and acetabulum without damaging the surrounding tissues. Osteotomy of the trochanter gives greater surgical exposure, facilitates surgery and reduces soft tissue damage.

There are several techniques to fix the trochanter after osteotomy; screws (Müller 1970), tension wires (Charnley & Ferreira 1964) and special bolts (Volz & Turner 1975, Charnley 1979).

The main problems related to trochanteric osteotomy are non-union, loss of trochanteric position and trochanteric bursitis.

With the use of Dutchman's hooks there was one non-union in 80 hips. With the wire technique, Clarke et al. (1979) reported an incidence of 8.3 per cent, Boardman et al. (1978) one of 5 per cent and Amstutz & Maki (1978) one of 4.9 per cent.

Loss of trochanteric position occurred in seven hips. In one case the migration was more than 10 mm, and only in two cases did it affect the end-result. In the other five hips it did not affect the post-operative clinical course and the patients had no complaints. With the wire technique the incidence of trochanteric migration ranges from 5 to 15.5 per cent (Amstutz & Maki 1978, Clarke et al. 1979).

An important complication was trochanteric bursitis. It occurred in eight hips (10 per cent), and six patients had the hooks removed on that account. Amstutz & Maki (1978) reported this diagnosis in 11 out of 728 total hip replacements, and Clarke et al. (1979) in seven out of 277. The high incidence in this series is probably due to the fact that the trochanteric hook is more bulky and therefore more irritating to the surrounding tissues than the wire knot.

No biomechanical studies were done to show the strength of this fixation. In our experience the use of two hooks or one hook and a screw with washer gives sufficient fixation of the trochanteric osteotomy. In osteoporotic bone, two hooks are necessary.

An advantage of the Dutchman's hook is that the angle of the osteotomy and the thickness of the trochanteric fragment are not critical. Fixation is simple, effective and not time-consuming. A disadvantage is the apparently higher incidence of trochanteric bursitis.

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