Acta orthop. Scandinav. *XXXV*, 348–357, 1965.

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ARTHROPLASTY OF THE HIP ACCORDING TO THOMPSON AND MOORE

By

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INTRODUCTION

The first attempt at arthroplasty of the hip was made by *Barton* in 1826. Later *Ollier* used muscle tissue; *Murphy*, fascia; and *Jones*, gold folio, as a support between the femur and the pelvis until the introduction of the Smith-Petersen vitallium cup in 1938. The advent of the Judet-prosthesis marked the beginning of the wave of enthusiasm for arthroplasty during the last decade and paved the way for various endoprostheses designed by *d'Augibné, Eicher, McBride, Moore, Thompson* and others.

Stainless steel and vitallium provided inert material for such appliances, and particularly vitallium appears to possess the desirable qualities.

MATERIAL

From 1953 to 1960 all together 32 patients underwent operation with insertion of Thompson or Moore prosthesis at the Orthopaedic Clinic, Härnösand. All the operations were unilateral. Of these 32 patients, one has in the meantime died and one has moved to another part of the country. The material available for the present after-examination thus consisted of 30 patients (20 females and 10 males).

The patients' ages at the time of the operation ranged from 32 to 76 (average 59 years). The females were, on the average, somewhat older than the males.

The interval between the operation and the after-examination was on the average 3–4 years (range 1 to 7 years).

Indications for Surgery and Operative Technique.

The indications for operation were coxarthrosis in 16 cases; pseudoarthrosis of the femoral neck in 12; and necrosis of the femoral head in 2. Of the patients with coxarthrosis, 6 had been treated previously with a Judet-prosthesis that had loosened or broken.

The operation was peformed under spinal analgesia in 28 cases and under general anaesthesia in 2. A Smith-Petersen incision was used in 17 cases and a Gibson-Mc Farland incision in the remaining 13.

Physiotherapy was started 2½ weeks after the operation with successively increasing weight-bearing after 4 weeks.

The patients spent on the average 12 weeks in hospital, half of them less than 8.

RESULTS

The main purpose of the present investigation was to detect any complications and to assess functional activity, mobility, pain, and postoperative changes in the roentgen appearance of the hip. Shepherd's schema was used in the estimation of functional activity and range of motion of the hip.

Complications.

Operative or early postoperative complications had occurred in 11 cases (Table 1).

TABLE 1
Postoperative Complications.

Fracture	3
Tip of prosthesis through corticalis	1
Infection	2
Dislocation	1
Thrombosis	4
Total	11

In 2 cases a fissure of the shaft had occurred on insertion of the prosthesis and in one case a supracondylar fracture on reposition of the prosthesis. One of the fissures had not been noticed and the patient had been allowed to leave his bed before the fissure had healed. This had resulted in bone resorption beneath the prosthesis and considerable slipping of the latter as well as in poor hip mobility and functional activity (Fig. 1). In the other 2 cases weight-bearing had not been allowed until the fissure and the fracture had healed. This had made a longer stay in hospital necessary, but later mobility and functional activity were excellent.

In one case the tip of the prosthesis had been driven through the corticalis of the lateral aspect of the femur in which it had gradually sunk deeper and deeper (Fig. 2). At the after-examination the mobility

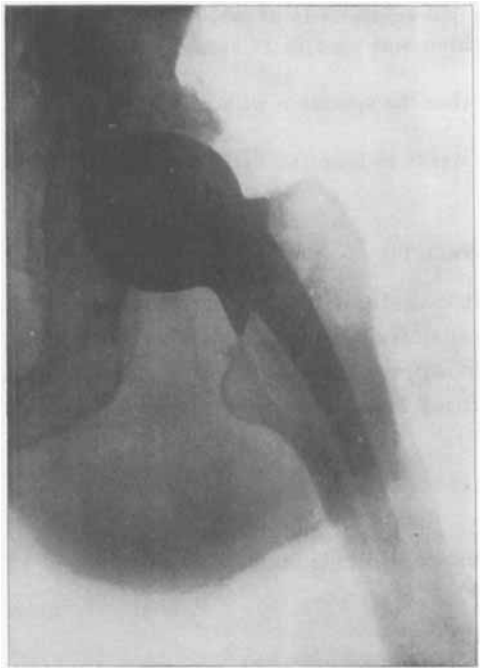


Fig. 1 a. *Fig. 1 b.*

Fig. 1 a. Immediately after operation. Fissure through lesser trochanter.
Fig. 1 b. 4½ years after operation. Severe slipping of prosthesis.

and functional activity proved excellent but there is surely a risk of spontaneous fracture or loosening of the prosthesis.

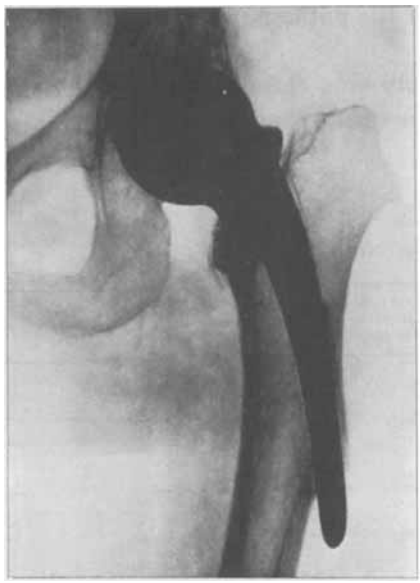
Verified infection occurred in 2 cases. In one of them the infection was refractory to antibiotic therapy and the prosthesis had to be removed 15 months after the operation. A superficial wound infection (in the other patient) responded favourably to antibiotics, and at the after-examination mobility as well as functional activity was excellent.

In one case dislocation of the prosthesis occurred immediately after operation and was afterwards removed.

Thrombosis of the leg had been noted in 4 cases.

Subjective Evaluation.

At the time of the after-examination the prosthesis was already removed in 2 cases. Of the remaining 28 patients 22 were satisfied or very satisfied indeed, while 6 were less satisfied or dissatisfied.



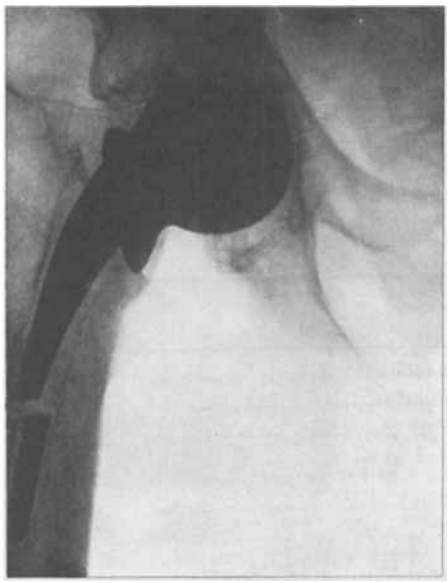


Fig. 2. *Fig. 3.*

Fig. 2. 3½ years after operation. Prosthesis now sunk deeper with further projection of tip through corticalis.

Fig. 3. 3½ years after operation. Prosthesis loose and broken.

Functional Activity.

Five of the 28 patients had returned to their previous work. Three of them were women who did all the work in fairly large households, one was a motor mechanic and the fifth was a farmer who did all the work, except hay-making, on a small farm with 4 cows and who did a fair amount of skiing in his spare time during winter. Eleven patients could only do light manual work such as cooking, washing of dishes and light housework. Twelve patients could not do work placing substantial demands on the hip.

All of the patients could use the toilet without help. Somewhat more than half could tie up their shoe laces themselves, take a bath and walk more than 1.500 metres

Back pain and knee pain were rare.

Atrophy of the thigh corresponding, on the average, to a decrease of one cm in the circumference of the limb, and shortening of the leg, on the average by one cm, were noted.

Most of the patients had a positive or questionable Trendelenburg

test and walked with a limp. Only 2 of the patients walked without any detectable limp.

In 22 of the cases functional activity was classified as excellent or good. The best result was found in the group "necrosis of the femoral head—pseudarthrosis" (Table 2).

TABLE 2
Functional Activity.

	Necrosis of the femoral head - pseudarthrosis	Coxarthrosis	Total
Excellent	10	5	15
Good	1	6	7
Fair	1	3	4
Bad	1	1	2
Total	13	15	28

Mobility of the Hip.

The range of movement of the hip was good with the following average values: flexion-extension 80°, abduction— adduction 30° and total rotation 20°. The values noted for the group "necrosis of the femoral head—pseudarthrosis" were better than those for the coxarthrosis group (Table 3). Flexion contracture was noted in more than half of the patients, especially in those with coxarthrosis.

TABLE 3
Mobility of the Hip.

	Necrosis of the femoral head - pseudarthrosis	Coxarthrosis	Total
Excellent	11	6	17
Good	2	7	9
Fair	0	2	2
Bad	0	0	0
Total	13	15	28

Hip Pain.

Starting pain and stiffness were most common among the patients with coxarthrosis. Four patients reported pain during rest and severe pain when walking. In all of these patients bone resorption was marked,

Fig. 4.

Fig. 5.

Fig. 4. 5½ years after operation. Severe slipping of prosthesis, subluxation, reactive new formation of bone in femoral diaphysis.

Fig. 5. 5 years after operation. Prosthesis loose and slipping down in femoral diaphysis.

the prosthesis had slipped and the greater trochanter abutted against the upper edge of the acetabulum. Two of these prostheses were loose, one was moreover partially dislocated, and the fourth was even broken (Figs. 3, 4, and 5). Eight patients were absolutely free from pain.

Roentgenographic Appearance.

Attempts were made to obtain exactly the same projections as at preceding examinations.

Twenty prostheses had slipped down into the femoral diaphysis (Table 4). Such displacement was most common in those cases where prostheses did not abut against the medial corticalis or the calcar femorale. Three prostheses had not been driven in completely. Two

of these which not even later abutted against the calcar femorale had continued to slip down in the diaphysis, while the third, which had afterwards abutted against the calcar femorale had not slipped further.

Bone resorption and slipping of the prosthesis varied with the interval between the operation and the after-examination (Table 5).

TABLE 4

Slipping of Prosthesis Abutting and not Abutting the Calcar Femorale.

	Slipping	No slipping	Total
Abutting	5	7	12
Not abutting	15	1	16
Total	20	8	28

TABLE 5

Slipping of Prosthesis within Different Intervals of Operation.

Age of prosthesis	Average slipping
1–2 years	8 mm
2–3 years	–
3–4 years	8 mm
4–5 years	12 mm
5–6 years	12 mm
6–7 years	23 mm

The Moore prostheses tended to slip less than the Thompson prostheses, the average distance being 2 mm for the former and 9 mm for the latter. But the Moore prostheses had been worn for a shorter period (average 2–3 years) than the Thompson prostheses (average 3–4 years). The longest distance a prosthesis had slipped was 34 mm.

Bone resorption in the acetabulum and so-called acetabular migration were seen in almost half of the cases and were most common in the coxarthrosis group.

Substantial calcification of the soft tissues was noted in 7 cases. This calcification, was, however, not correlated with certainty with previous operations, indications for operation, type of incision used or the interval between the operation and the after-examination.

Diffuse sclerosis was seen in the region of the lesser trochanter as well as at the tip of the prosthesis and especially lateral thereto. In some cases a layer of sclerosis was seen along the shaft of the prosthesis.

DISCUSSION

The Moore and Thompson prostheses, as well as the Judet-prostheses and the cup arthroplasties, give good early results. The end-results obtained with the Judet-prostheses and the cup arthroplasties did not come up to expectation. Will the end results of treatment with Thompson or Moore prostheses be better? Anything like a reliable answer to this question requires thorough after-examinations and a very long follow-up. *Thompson*'s review was based on 34 patients who had been operated upon 2½ years previously, *Moore*'s on 159 patients reviewed 2 to 6 years after operation, and an American after-examination by questionnaire covered more than 10.000 cases in which a period of 4 years on the average had elapsed since the operation. These authors reported operative and post-operative complications, but gave only scanty data about the condition of the patients at the review. The operative and post-operative complications in the present material were roughly the same as in other series on record, but the end-results appeared to be less good.

Neither *Thompson* nor *Moore* mentioned bone resorption or slipping of the prosthesis. Yet these complications were common in the present material and were most often the cause of the poor long-term-results. Slipping was particularly common when the prosthesis did not abut against the medial corticalis or the calcar femorale, possibly in combination with early and uncontrolled weight-bearing.

In order to diminish the risk of bone resorption and slipping of the prosthesis, the latter should primarily abut against the calcar femorale and the patient should use a stick for a long time, possibly for the rest of his life.

SUMMARY

Thirty patients were after-examined clinically and roentgenologically 1–7 years after insertion of hip prosthesis. Bone resorption and slipping of the prosthesis proved common. Rarely could the patients return to heavy work, but only few of them required assistance for their day-to-day existence.

RESUME

30 malades ont été réexaminés cliniquement et radiologiquement entre 1 et 7 ans après insertion d'une prothèse de la hanche. On a couramment constaté une résorption osseuse et un glissement de la prothèse. Les malades peuvent rarement reprendre un travail dur, mais

très peu d'entre eux ont besoin de secours pour assurer leur subsistance de tous les jours.

ZUSAMMENFASSUNG

Dreissig Patienten wurden 1–7 Jahre nach der Anbringung einer Hüftprothese klinisch und röntgenologisch nachuntersucht. Knochenresorption und Gleiten der Prothese erwies sich als ein gewöhnliches Ereignis. Nur selten konnte ein Patient schwere Arbeit wieder aufnehmen, aber nur wenige benötigten Hilfe für das tägliche Leben.

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