EXCISION ARTHROPLASTY OF THE HIP

C. S. HAW and D. H. GRAY, EDINBURGH, SCOTLAND

From the Princess Margaret Rose Orthopaedic Hospital, Edinburgh

The results of excision arthroplasty on forty hips in thirty-two patients have been studied by personal review. The mean follow-up was ten years and the results were graded in the Lazansky system. The outcome was fairly predictable, most patients achieving a fair to good result. The patients were satisfied with the operation in unilateral cases as a secondary operation, but it was generally unsatisfactory as a primary procedure or when performed bilaterally. Pain relief was satisfactory, and previously infected hips achieved sound wound and bone healing. Half could walk with no aid or one stick. No correlation could be found between the radiological appearances and the quality of the result.

Girdlestone (1945) popularised the operation of excision of the femoral head and neck for the treatment of tuberculosis and other disorders of the hip. Its early history and current views on indications and technique have been summarised in reviews by Nelson (1971) and Mueller (1973). The addition of an angulation osteotomy (Batchelor 1945) has been advocated to improve stability (Parr, Croft and Enneking 1971), but its value has been questioned (Shepherd 1960).

The prevailing enthusiasm for total hip replacement will produce some patients for whom the removal of the components will be necessary for sepsis or for mechanical reasons. With replacement arthroplasty being considered more frequently for young patients, it is essential to know the results of this fall-back situation. Reinsertion of a prosthesis in the face of sepsis (Wilson, Aglietti and Salvati 1974) is unlikely to be used until wider and favourable experience with it has been reported from special centres.

For these reasons it was decided to review the long-term results of excision arthroplasty of the hip, without osteotomy, undertaken in this centre. Assessment techniques employed currently for total hip replacement patients were used.

METHOD

Excluding most of the rheumatoid cases, which are being reviewed separately, a total of sixty-six patients underwent excision arthroplasty in Edinburgh in the past fifteen years. Of these, twenty-eight patients were dead at the time of follow-up, four were untraceable and two declined or were unable to attend for interview.

This report is based therefore on a survey of thirty-two patients with a total of forty excision arthroplasties, eight having had bilateral procedures. Patients were interviewed individually, either at a special review clinic

or in their homes. The surgeon carrying out the interview was in every case a neutral observer. The assessment was facilitated by the use of the hip chart devised by Professor J. Charnley of Wrightington on the basis of the work of Lazansky (1967). Patients attending hospital were radiographed and the original radiographs were available for study.

RESULTS

The patients—Of the thirty-two people interviewed, twenty-one were female. All except one of the eight patients with bilateral arthroplasty were female. The mean age at operation was 55.5 years (range fourteen to seventy-seven) and the mean age at review 65.4 years, giving a mean follow-up period of ten years. Of the forty hips studied the basic pathology was osteoarthritis in twenty-four, non-union of fracture in six, congenital dislocation of the hip in three, rheumatoid arthritis in two, ankylosing spondylitis in two, and post-radiation osteitis, syphilitic neuropathy and spastic tetraplegia each in one case.

Management—The mean duration of stay in hospital was three months. Almost all of the patients were treated by skeletal traction for six weeks, a Steinmann pin being incorporated in a below-knee plaster. The exact details of management in some instances were not clearly recorded. No retrospective analysis of operative details could be made to elucidate factors which might influence the result, for similar reasons. Just over half the patients were treated with a caliper for varying periods after operation; two patients were still using a caliper at the time of review. There was no association between the use of a caliper and the result obtained.

The patients' assessment—The result was judged to be satisfactory by the patient in thirty-one of the forty hips (77 per cent). Each patient was asked to indicate as

C. S. Haw, F.R.C.S.Ed., Senior Registrar, Princess Margaret Rose Orthopaedic Hospital, Fairmilehead, Edinburgh EH10 7ED, Scotland.
D. H. Gray, F.R.A.C.S., Senior Lecturer, University Department of Orthopaedic Surgery, Clinical Research Unit, Princess Margaret Rose Orthopaedic Hospital, Fairmilehead, Edinburgh EH10 7ED, Scotland.

objectively as possible if he was satisfied or dissatisfied overall with the operation without regard to individual factors such as pain, stability or mobility (Table I). All satisfied patients agreed they would have the operation again given the same set of circumstances, and all dissatisfied patients would have refused excision arthroplasty if they had known the actual outcome.

TABLE I

PRIMARY COMPARED WITH SECONDARY EXCISION ARTHROPLASTY

Patients' subjective assessment of result	Primary Girdlestone	Secondary Girdlestone	Total hip operations
Satisfied . . .	9	22	31
Dissatisfied . . .	7	2	9

TABLE II

OPERATIONS PRECEDING SECONDARY GIRDLESTONE ARTHROPLASTY

Judet arthroplasty	8
Cup arthroplasty	7
McKee-Farrar arthroplasty	4
Charnley arthroplasty	1
Moore's arthroplasty	2
Colonna reconstruction arthroplasty	2

TABLE III

SATISFACTION COMPARED WITH AGE AT OPERATION (HIPS)

Age at operation (years)	Satisfied		Dissatisfied	
	Primary excision	Secondary procedure	Primary excision	Secondary procedure
10-49	6	2	0	1
50-79	3	20	7	1

TABLE IV

ANALYSIS OF UNILATERAL AND BILATERAL CASES (HIPS)

Excision arthroplasty	Unilateral		Bilateral	
	Primary excision	Secondary procedure	Primary excision	Secondary procedure
Satisfied . . .	3	17	6	5
Dissatisfied . . .	4	0	3	2

The most striking result of the survey became apparent when the results of primary and secondary excision arthroplasties were compared. Of sixteen primary Girdlestone procedures, seven resulted in unsatisfactory hips, whereas only two unsatisfactory hips were found in twenty-two secondary operations. Both hips in this secondary group were in patients with bilateral excision arthroplasty; the opposite hip in each case was satis-

factory. Of the seven hips with unsatisfactory primary excision arthroplasty four were unilateral; one patient had unsatisfactory results in both hips, and two had had bilateral operations, with one hip being unsatisfactory. The primary procedures necessitating subsequent excision arthroplasties are shown in Table II; thirteen patients had had one previous operation; the remaining four had had two or three operations before the excision arthroplasty.

It became apparent that age was an important factor in determining a successful outcome from a primary Girdlestone arthroplasty (Table III). Thus, every patient presenting before the age of fifty obtained a satisfactory result, whereas only 30 per cent of the hips operated on in the over-fifty age group were satisfactory. This age factor could indicate either that old people do not tolerate the procedure well, or that the result deteriorates with time, and that the younger patients may become eventually dissatisfied. Such an assessment is impossible to make accurately in a retrospective survey but there was no obvious indication of deterioration with time. An improvement rather than deterioration of function with time was reported by Shepherd (1960). The average age of the patients who had secondary arthroplasty was fifty-three years, indicating that good results can be achieved in the older patient.

The assessment of bilateral and unilateral cases is shown in Table IV. Of the eight patients who had bilateral operations, four were completely satisfied, one was dissatisfied with both hips and three were satisfied with one side only. There is thus a higher proportion of dissatisfied patients in the bilateral group, as would be expected. There was also a high incidence of primary procedures in this group. The two dissatisfied patients in the secondary group had had bilateral arthroplasty performed in each case, only one hip being unsatisfactory.

Detailed analysis revealed no relationship between the primary pathology and the patient's satisfaction or dissatisfaction with the operation. The small numbers involved make us unable to comment upon the value of the procedure in rheumatoid arthritis or in ankylosing spondylitis.

Pain—The grading of pain in all hips is shown in Table V. Forty-seven per cent of joints were pain free, and a further 25 per cent reported enough alleviation of pain to give a satisfactory result. Pain was made worse in two hips, unchanged in seven, lessened in twelve and abolished in nineteen. It is of interest that three patients with grade three pain following secondary excision arthroplasty nonetheless regarded the result as satisfactory on account of improved hip function.

Function—Walking ability and gait are also summarised in Table V. Almost a quarter of the patients did not require any walking aid, and another 25 per cent walked with one stick. The remainder required two sticks or other aids, and with one exception were able to avoid being chair-bound or bedridden.

There was no correlation between disability and

shortening, which in all cases was about four centimetres. Surprisingly, two patients showed a negative Trendelenburg test. At the time of review there were two women under the age of forty who had had bilateral arthro-

TABLE V
ASSESSMENT BY THE METHOD OF LAZANSKY (1967)

Walking ability (hips)	1	2	3	4	5	6	
Satisfied	5	5	11	8	2	0	Mean
Dissatisfied	6	0	1	1	1	0	
Gait without sticks (hips)							
Satisfied	14	4	10	2	1	0	
Dissatisfied	6	1	2	0	0	0	
Unilateral cases							
Pain: (hips)							
Satisfied			2	3	4	11	5.3
Dissatisfied			3	1			3.3
Function: (patients)							
Satisfied	1	3	8	6	2		3.4
Dissatisfied		3	1				2.4
Mobility: (patients)							
Satisfied		3	3	9	5		3.8
Dissatisfied			1	2	1		3.9
Bilateral cases							
Pain: (hips)							
Both satisfactory				1		3	5.5*
One satisfactory			1	2			
Both unsatisfactory		1					2.8†
Function: (patients)							
Both satisfactory		2	1	1			2.9
One satisfactory		2		1			2.5
Both unsatisfactory		1					1.8
Mobility: (patients)							
Both satisfactory		2		2			3.2
One satisfactory			2	1			3.4
Both unsatisfactory				1			3.6

* Mean rating of "satisfied" hips.

† Mean rating of "dissatisfied" hips.

TABLE VI
COMBINED TOTALS
All cases (Lazansky)

Pain (hips)	4.8
Function (patients)	3.0
Motion (patients)	3.7
Final overall grade	3.8

plasties. These two patients alone were asked about any sexual problems and both did in fact have difficulties; the intermalleolar distances were eighteen and forty-three centimetres.

Range of movement—There was no relationship between the presence of contracture and the result, fifteen of the forty hips demonstrating a fixed deformity. Average ankle separation was fifty-two centimetres. Figure 1 illustrates the extremes, and means, of movement in the hips. Thirteen patients had fixed flexion contractures, the range of which was from 5 degrees to 50 degrees, with a mean of 23 degrees. One had an adduction contracture of 10 degrees, and another a lateral rotation contracture of 10 degrees. There was no record in this series of any psoas tendon or lesser trochanter transfers being undertaken to correct a lateral rotation deformity. **Lazansky grading**—The detailed grading of pain, function and mobility shown in Table V is summarised in Table VI. It is apparent that mobility is not an important factor in deciding the result. There is some difference between the satisfied and dissatisfied patients in terms of function, but the major difference between these two groups becomes apparent when pain is analysed. The overall grading of 3.8 achieved in this series corresponds with a "good" result on the Lazansky scale.

FIG. 1

The extremes and means of motion for all cases are shown.

Radiographic appearances—There was no correlation between the radiographic appearances and the patient's satisfaction with the operation. Observations were made of such radiographic features as the degree of bony apposition, the presence or absence of the lesser trochanter, the degree of shortening, and the amount of peri-articular calcification. Signs of obvious bone contact, with marked sclerosis, between femur and pelvis were seen in both satisfied and dissatisfied patients. There was no correlation between the smoothness of the femur or trimming of the acetabular margin and the final result. **Excision arthroplasty secondary to total hip replacement**—Three patients had an initial McKee-Farrar replacement arthroplasty and two a previous Charnley arthroplasty. All five patients were satisfied with the results of their excision arthroplasty; three achieved a good result, while two showed a very good result in the Lazansky classification. These five patients had infected prosthetic arthroplasties. At review, all were healed and none showed any sign of residual bone infection.

Cases of special interest—Three patients had a Girdlestone arthroplasty with a contralateral Charnley low-friction arthroplasty; two were more satisfied with the prosthetic replacement. One patient with an excision arthroplasty and a contralateral cup arthroplasty considered the latter to be more stable and satisfactory. One patient with bilateral painful excision arthroplasties had one converted to a low-friction arthroplasty, with beneficial relief of pain but no improvement in disability. One patient was more satisfied with a Judet arthroplasty inserted twenty-four years ago than he was with his contralateral Girdlestone arthroplasty, as this proved less stable. One patient with an ipsilateral below-knee amputation for peripheral vascular disease functions well with a prosthetic limb.

DISCUSSION

The results of this survey demonstrate that the Girdlestone arthroplasty can be an extremely valuable salvage procedure for the failures of previous hip surgery.

Shepherd (1960) wrote: "many patients achieve no more than a 'fair' result but 'poor' results are few". She showed that the end-result is predictable and that its quality does not deteriorate with time, an opinion confirmed by Murray, Lucas and Inman (1964). Pain relief is predictable, the commonly quoted figure being between 80 and 90 per cent satisfactory pain alleviation. The range of motion is good, and the functional results commonly acceptable although in no way matching that of total hip replacement (Charnley 1972). The procedure is disappointing for the management of malignant deposits in the upper end of the femur (Poigenfurst, Marcove

and Miller 1968), but it offers a satisfactory solution for the problem of deep sepsis. Collis and Johnston (1971) and Parr *et al.* (1971) were able to obtain healing in twenty-six out of twenty-eight and eleven out of twelve patients respectively. Patterson and Brown (1972) in reviewing the McKee-Farrar total hip replacement had found satisfactory results following seventeen secondary Girdlestone procedures in which the twelve available for review were thought to be at least as good as they were before hip replacements.

Taylor (1950) and Scott (1963) emphasised the need to resect the acetabular rim to prevent bony contact between the upper end of the femur and the pelvis. Nelson (1971) described the method of flap interposition between the bone ends but Murray *et al.* (1964) achieved satisfactory results without such soft-tissue interposition. Parr *et al.* (1971) secured good results without interfering with the acetabulum. It would seem reasonable when removing a hip replacement to eliminate all cement and protruding osteophytes without necessarily resecting the acetabular rim. Good results were seen in this series in spite of clear radiographic evidence of bone abutment of the femur on the pelvis.

In our experience the very poor results from primary excision arthroplasty probably reflect the resultant lack of stability and inadequate pain relief. Lateral rotation contracture has not been a problem in this series and we advise the use of skeletal traction for six weeks to facilitate healing in a neutral position. The advisability of lateral psoas transfer (Taylor 1966) in the reconstruction following the removal of a hip prosthesis is uncertain, but is probably unnecessary.

We would like to thank Miss V. Lindsay and her staff and Miss Y. Fraser for their secretarial help and aid in tracing patients. We also wish to express our gratitude to those surgeons who gave us permission to review their patients.

REFERENCES

- Batchelor, J. S. (1945) Excision of the femoral head and neck in cases of ankylosis and osteoarthritis of the hips. *Proceedings of the Royal Society of Medicine*, **38**, 689–690.
- Charnley, J. (1972) The long-term results of low-friction arthroplasty of the hip performed as a primary intervention. *Journal of Bone and Joint Surgery*, **54-B**, 61–76.
- Collis, D. K., and Johnston, R. C. (1971) Complete femoral-head and neck resection. *Journal of Bone and Joint Surgery*, **53-A**, 396–397.
- Girdlestone, G. R. (1945) Discussion on treatment of unilateral osteoarthritis of the hip-joint. *Proceedings of the Royal Society of Medicine*, **38**, 363.
- Lazansky, M. G. (1967) A method for grading hips. *Journal of Bone and Joint Surgery*, **49-B**, 644–651.
- Mueller, K. H. (1973) Resection of the femoral head and neck and resection-angulation osteotomy. In *Surgery of the Hip Joint*, pp. 644–656. Edited by R. G. Tronzo. Philadelphia: Lea and Febiger.
- Murray, W. R., Lucas, D. B., and Inman, V. T. (1964) Femoral head and neck resection. *Journal of Bone and Joint Surgery*, **46-A**, 1184–1197.
- Nelson, C. L. (1971) Femoral head and neck excision arthroplasty. *Orthopaedic Clinics of North America*, **2**, 127–137.
- Parr, P. L., Croft, C., and Enneking, W. F. (1971) Resection of the head and neck of the femur with and without angulation osteotomy. *Journal of Bone and Joint Surgery*, **53-A**, 935–944.
- Patterson, F. P., and Brown, C. S. (1972) The McKee-Farrar total hip replacement. *Journal of Bone and Joint Surgery*, **54-A**, 257–275.
- Poigenfurst, J., Marcove, R. C., and Miller, T. R. (1968) Surgical treatment of fractures through metastases in the proximal femur. *Journal of Bone and Joint Surgery*, **50-B**, 743–756.
- Scott, J. C. (1963) Pseudarthrosis of the hip. *Clinical Orthopaedics and Related Research*, **31**, 31–38.
- Shepherd, M. M. (1960) A further review of the results of operations on the hip joint. *Journal of Bone and Joint Surgery*, **42-B**, 177–204.
- Taylor, R. G. (1950) Pseudarthrosis of the hip joint. *Journal of Bone and Joint Surgery*, **32-B**, 161–165.
- Taylor, T. K. F. (1966) The place of the Girdlestone pseudarthrosis in the treatment of hip disorders. *Journal of Bone and Joint Surgery*, **48-A**, 1227–1228.
- Wilson, P. D., Jun., Aglietti, P., and Salvati, E. A. (1974) Subacute sepsis of the hip treated by antibiotics and cemented prosthesis. *Journal of Bone and Joint Surgery*, **56-A**, 879–898.