

## INTERTROCHANTERIC OSTEOTOMIES IN OSTEOARTHRITIS OF THE HIP

*By*

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At the present time, 25 years after its introduction in 1935 by McMurray, intertrochanteric displacement osteotomy is widely regarded as a useful tool in the management of painful osteoarthritis of the hip joint. It has come into general use in recent years and despite its long standing, information about the late results of the method is scarce. Major interest has centered around mechanical and technical aspects of the operation, and the causes underlying the unmistakable immediate good results.

TABLE 1  
*Osteoarthritis of the hip joint treated by various surgical methods.*

	Number of cases					
	Number operated	Included in follow-up	Satisfied with improvement		Dubious	Unimproved
			No.	%		
Obturator nerve resection .....	18	18	5	30	9	4
Adductor tenotomy .....	16	15	8	50	1	6
Osteotomy .....	19	17	13	80	3	1
Arthrodesis .....	9	6	5	85	1	0

During 1955 and 1956, a number of different operative procedures were performed in this clinic. After a certain time had elapsed, a questionnaire was sent out to the patients in an attempt to evaluate the effect of the different operations. The answers are tabulated in Table 1. A longer period of follow-up might conceivably change the incidence of

favourable results, but this would probably hardly imply an improvement of poor results. It is more likely that the number of favourable results would be reduced. The table shows that the most effective methods were arthrodesis and osteotomy.

On the basis of these observations, we decided during the next few years to perform osteotomy in cases of osteoarthritis of the hip joint with so much pain on weight-bearing that walking became severely impaired, and with pains at night following exercise. All patients operated upon were unable to work. The operation was performed in 54 cases during the period from 1956-1959.

It has been claimed that the effect of the operation is not dependent on the degree of medial displacement of the distal fragment. Nevertheless, the literature contains attempts at interpreting freedom of pain as a function of changed mechanical conditions. Many authors also suggest the possibility of improved vascularization to account for good results. Neither theory is endorsed by factual evidence. In this presentation the type of fixation used has been chosen as the point of reference.

TABLE 2  
*Various types of fixation in displacement osteotomies.*  
*Complete relief of pain was obtained in 30 %.*

		Without osteo- synthesis	Kessel plate	Blount plate	McKee plate	Tup- man plate
Number of operations ....	54	13	23	5	8	5
Complete relief of pain ...	18	4	7	2	3	2

The surgical exposure permits a variety of techniques. The following method has been found suitable. The incision is made from the anterior superior iliac spine to the upper end of the greater trochanter, and continued along the femur. The tensor fasciae latae muscle is divided in the direction of its fibers, the fascia lengthwise, followed by a small transverse incision just below the greater trochanter. The vastus lateralis is detached from its posterior attachment on the femur, neither its vascular nor nervous supply being impaired. There is little bleeding. The exposure permits a good view of the subtrochanteric area from a lateral and ventral aspect, including the anterior portion of the neck. It is possible to see exactly when the osteotomy is made, how the distal end of the femur may be displaced, and to check the adaptation of the cut surfaces. The osteotomy is made with the bone incision



*Fig. 1.*

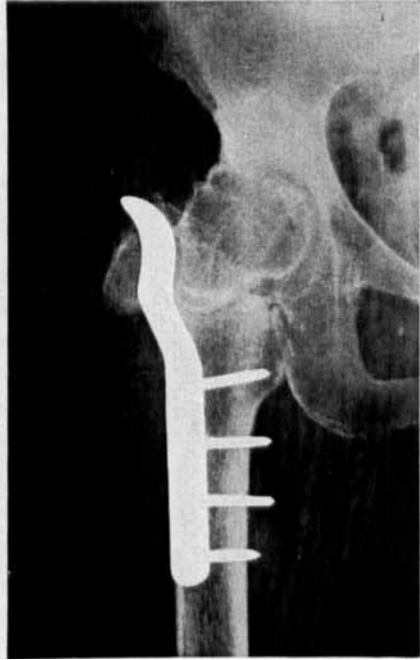
Displacement osteotomy without internal fixation.

parallel to the long axis of the neck. This permits medial displacement with little need for bone resection, while at the same time ensuring satisfactory contact between the bony surfaces.

In 13 cases, *osteotomy without internal fixation* was performed. All patients were immobilized in a double hip spica for 3 weeks on an average, followed by a short single leg spica for an additional 5 weeks. The patients were allowed up in the cast, after about 4 weeks. Some weight-bearing was permitted, and mobilization of the knee joint encouraged. In 9 cases, the roentgenograms showed the presence of callus after two months. In the remaining cases healing occurred after 3 months. The degree of medial displacement varied. A varus deviation developed in 4 cases. In 3 cases, thrombosis set in during the period of healing, causing painful swelling of the operated limb. In all cases, the spontaneous pains at rest disappeared and pain on weight-bearing was reduced. The patients declared themselves satisfied with this result. Complete relief of pain was achieved in only 4 cases. Seven patients had to walk with a stick. Mobility became in no case better than before the operation. In the majority of cases the range of movement had de-



*Fig. 2.*  
Osteotomy with Kessel plate fixation.



*Fig. 3.*  
Blount plate in situ.

creased, without the patients considering it a cause for complaint. The over-all impression is that although the subjective results of the operation were remarkably satisfactory, it did not come up to expectations with regard to functional qualifications.

*Osteosynthesis with a Kessel plate* was performed in 23 cases. In 16 cases a plaster was applied after operation and worn for 2 months. Seven patients were not immobilized. The incidence of thrombosis was high in both groups. Callus could be observed after 3 months, in some cases slightly later. Radiological evidence of healing was found after 2 months in only 2 cases. The number of patients with complete relief of pain was 7, all of them belonging to the group immobilized in plaster. Wound infection developed in one case, while in another the osteotomy failed to heal. Eleven patients were unable to walk without a stick. As a rule, mobility was less than before the operation. These observations have led us to the conclusion that no advantage is to be gained from using the Kessel plate. It may even cause delayed healing due to the extensive damage the nail-plate causes to the cancellous bone. The plate



Fig. 4.  
McKee nail-plate fixation.



Fig. 5.  
Internal fixation with a Tupman plate.

does not offer sufficient stability to the osteotomy to replace plaster fixation.

In agreement with the group in which no osteosyntheses were performed, the patients claimed that the operation had given them relief of spontaneous pains and reduced pain on weight-bearing.

*Osteosynthesis with Blount's plate* was performed in 5 cases. As the fixation achieved was hardly secure, plaster was applied. Thrombosis developed in 2 cases. Roentgenologic evidence of callus was found 2-3 months after operation. The method did not appear to hold any appreciable advantages over osteosynthesis with the Kessel plate, even though the degree of damage to the bone tissue was less.

The *McKee nail-plate* was used in 8 cases. The initial stability of the osteosynthesis was better than in either of the methods mentioned before, but the degree of medial displacement was less. In 5 cases no plaster fixation was applied. Callus could be demonstrated in the roentgenogram after 3 months. Weight bearing was allowed after 2-3 weeks, regardless of whether plaster fixation had been used or not. Three pa-

tients were entirely free of pain. The majority had to use a stick. The incidence of asymptomatic cases was consequently not particularly high in this group either.

The *Tupman nail-plate* was used in 5 cases up to December 1959. During 1960 it was the method of choice. The 5 cases which permit evaluation give occasion for the following comments. In no case was plaster fixation considered necessary. The patient was allowed to leave his bed after 2-3 weeks, while mobilization exercises of the knee and hip joint could be started one week following operation. Callus could be observed after 2 months. Three patients had to use a stick. All patients were improved, but only 2 were entirely free of pain. Thrombosis did not occur.

#### DISCUSSION

The principal reason for operative treatment of osteoarthritis of the hip joint is to provide relief of pain and secondly, to preserve or improve mobility. Viewed against this background, the results of our osteotomies cannot be considered wholly favourable. Unquestionably, the pain is alleviated, although it does not entirely disappear. Spontaneous aching pain ceases, however, and the majority of patients note a subjective improvement. The patient's activity, on the other hand, is hardly increased. A great number are forced to use a stick. The range of movement of the hip joint was often reduced, seldom improved.

Obviously, the end-results are considerably influenced by the selection of cases. Many authors have held that an osteotomy should not be performed if mobility is already poor before the operation. If this limitation is accepted, better results will probably be obtained. On the other hand, the indications for surgery then become altogether relative.

Several authors have claimed that osteotomy affects the pathologico-anatomical process of osteo-arthritis. According to this theory, a reconstruction takes place in which the head is revitalized and the joint space regains a more normal appearance. No evidence of this has been seen in this material. Sometimes the roentgenogram shows an increased joint space. Pictures taken both during and immediately following the operation have clearly demonstrated that the position of the head in the acetabulum may lead to an erroneous interpretation of the joint space. No basis for the belief that the pathological process is in any way altered was found. The optimism with which osteotomy is regarded is undoubtedly exaggerated.

Although osteotomy offers possibilities for correction of deformities,

the effect of the operation is not always lasting. Flexion and adduction contractures often recur, even after the fragments have healed in the desired position.

The conditions for healing are good and callus occurs after 2-3 months, regardless of the technique used. The Tupman nail-plate, recently introduced from England, provides good internal fixation during healing and permits early mobilization. Plaster fixation is unnecessary. This implies fewer complications, as mobility can be better preserved and the risk of thrombosis is reduced. Moreover, hospitalization time is cut down, which means that the indications for operation may be extended to include even elderly patients.

#### S U M M A R Y

Various types of internal fixation in displacement osteotomies for osteoarthritis of the hip are discussed. Even if the number of cases with complete relief of pain amounts to only 30 %, about 80 % claim that they are improved. The mobility in the hip does not seem to increase and the radiographic appearance of the osteoarthritis does not change. The advantage of safe internal fixation makes postoperative plaster fixation unnecessary. Tupman plates were found very helpful. Better care can then be taken of hip and knee joint mobility and the time of rehabilitation is shorter.

#### R E S U M E

Différents types de fixation interne dans les ostéotomies de déplacement pour les ostéoarthrites de la hanche sont discutés. Bien que le nombre des cas complètement soulagés de douleurs ne se soit élevé qu'à 35 % seulement, 80 % prétendent qu'ils sont sensiblement améliorés. La mobilité de la hanche ne paraît pas s'accroître et l'apparence radiographique de l'ostéoarthrite ne change pas. L'avantage d'une fixation interne sûre est qu'elle rend superflue la fixation postopératoire dans le plâtre. On a constaté que les plaques Tupman sont utiles. Il est plus facile de veiller à la mobilité de la hanche et du genou et le temps de restauration est plus court.

#### Z U S A M M E N F A S S U N G

Verschiedene Arten von innerer Fixierung bei Verschiebungsosteotomien in Fällen von Osteoarthritis des Hüftgelenkes werden besprochen.

Selbst wenn die Anzahl der Fälle mit vollständiger Beschwerdefreiheit nur 30 % beträgt, geben doch ungefähr 80 % eine Besserung an. Die Beweglichkeit der Hüfte scheint nicht zuzunehmen und das röntgenologische Aussehen der Osteoarthritis verändert sich nicht. Eine verlässliche innere Fixierung macht die postoperative Ruhigstellung im Gipsverbande unnötig. Tupmans Platten erwiesen sich als nützlich. Mittels ihrer Verwendung kann man eine bessere Vorsorge für die Beweglichkeit des Hüft- und Kniegelenkes treffen und die Zeit der Wiederherstellung abkürzen.

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