TREATMENT OF OSTEOARTHRITIS OF THE HIP BY OSTEOTOMY

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The ideal treatment for osteoarthritis of the hip should give a stable, painless joint, with a full range of movement and no shortening. Arthroplasties have been devised in an attempt to achieve this, but the results are still unreliable. Consequently it was felt worthwhile to reassess the results of treatment by upper femoral osteotomy. This paper is based on a review of forty-six femoral osteotomies in forty-five patients, performed at Harlow Wood Hospital between 1933 and 1953.

Patients with osteoarthritis seek advice for several reasons, but pain is practically the only symptom for which the patients gladly undergo operative treatment. At this stage, almost without exception, some degree of fixed deformity is present, either of rotation, flexion or adduction.

THE RATIONALE OF UPPER FEMORAL OSTEOTOMY

In 1935 Malkin, before the British Medical Association at Melbourne, advocated femoral osteotomy for the relief of this condition (Malkin 1936). In that year McMurray (1935) published a paper on the same subject. Malkin carried out his osteotomy at about the level of the lesser trochanter and corrected the deformity (Fig. 1). McMurray (1939), on the other hand, divided the bone obliquely upwards, so that the upper end of the osteotomy was at the lower border of the level of the head of the femur. He then displaced the shaft inwards until it lay below the lower margin of the acetabulum (Fig. 2). He considered this displacement to be an essential part of the operation. More recently Osborne and Fahrni (1950), from the same orthopaedic school, concluded from a review of their cases that marked displacement was a necessity for lasting relief of pain. They considered that a poor result was almost inevitable unless medial displacement of the femoral shaft was adequate, although there might be some temporary relief. Figure 3 shows the degree of displacement at which they aimed, and this is probably accepted by most surgeons as being necessary.
Nevertheless we consider that there must be some further unrecognised factor to account for the unsatisfactory results in Osborne and Fahrni's series. Eighteen of the cases in our series have been followed for between ten to twenty years. Radiographs were not available in three cases, but in the remaining fifteen the displacement of the femoral shaft appeared to be only slight (Figs. 4 to 6). All these eighteen patients, however, had almost complete relief of pain; twelve having none and the remaining six having only slight pain. Indeed one patient, who was seventy-four at the time of her operation thirteen years ago, stated that she had been able to go rough shooting and had even been for a walking tour in Spain. Needless to say, she was an exceptionally determined old lady.

Examination of both antero-posterior and lateral films taken in this series suggests to us that the only essential features of the operation are 1) to divide the bone and 2) to correct deformity. The exact level of the osteotomy and the amount of displacement appear to be of secondary importance. It is certain, however, that it is a simple operation and always gives stability if correctly carried out.

**RESULTS**

**Relief of pain**—The most important single factor to be considered is the relief of pain. Figure 7 shows the relief obtained in the forty-six cases. It will be seen that in twenty-five cases there was complete freedom from pain; in fifteen there was only slight pain, amounting to some aching in wet weather; and in only six was the pain severe enough to indicate a failure of the operation.

In the cases in which there was a moderate amount of residual pain further examination after these statistics were compiled has shown that two of them now have little or no pain. One patient is at work as a cobbler and the other is a married woman, who is now able to do all her own work and attend to her garden. The decrease of pain in these cases suggests that patients are likely to improve for a considerable time after osteotomy. Of the three
cases in which there was no benefit from the operation, the osteotomy was found to be ununited in two.

Figure 8 correlates the degree of residual pain with the years since operation. It will be seen that all patients operated upon ten years ago or more have very little pain. Indeed, all the patients with severe or moderate pain have been operated upon within the last ten years. The gap in numbers from three to ten years is largely due to the introduction of various types of arthroplasty.

Movement—Sacrifice of some mobility is a fairly constant finding after this operation, though the loss is not so great as is generally supposed. Figure 9 shows the movement at the hip when examined at the follow-up. In six cases there was no movement because of either bony or sound fibrous ankylosis; and in nine there was only a degree or two of movement. Eleven patients had between five and nineteen degrees of movement. (Although this does not give a normal gait, it is sufficient to prevent excessive strain being thrown on the back. In patients with osteoarthritis of the spine such a range may be sufficient to prevent the onset of lumbar pain.) Nine patients retained between 20 and 40 degrees of movement and eleven more had over 40 degrees. Thus, twenty patients, or almost half those investigated, retained a satisfactory range. Nearly all patients had between 10 and 30 degrees of fixed flexion, and this appeared to have no relation to the excellence of the results.
Diagram shows residual pain in terms of years.

Diagram shows the amount of hip movement on examination at follow-up.
DISCUSSION

A study of these cases has convinced us that femoral osteotomy is a really worthwhile operation, as some 87 per cent of the patients were largely relieved of their pain and a further 6 per cent were improved. There are, however, some disadvantages which require further discussion as follows.

Long stay in hospital—As most of these patients are elderly, this is a very real problem.

Stiffness of the knee—Despite plaster immobilisation, we found that this was not common, and in this we agree with other writers.

Loss of hip flexion—In 41 per cent of the cases the range decreased by 10 degrees or more (though it should be noted that in 17 per cent the range actually increased). For this reason osteotomy may be contra-indicated in patients with an associated advanced arthritis of the spine.

**Fig. 10**
Figure 10—The type of plate and bolt used for internal fixation. **Fig. 11**—Method employed for producing minor variations in the angle of the neck.

Difficulty of adequate fixation in plaster—In the very obese, it is impossible to obtain a well fitting plaster and patients who suffer from such disorders as asthma or bronchitis are unable to tolerate it.

Internal fixation—The problem of immobilisation has to a large extent been overcome by the use of internal fixation. This has also enabled the operation to be extended to many patients in whom plaster fixation would have been difficult or even dangerous. Internal fixation has been effected by using a nail and plate of modified design. It was found that it was almost impossible to use one of the orthodox types of nail and plate, because once the nail had been passed up the neck of the femur it was impossible to apply the plate to the femoral shaft because of the marked lateral rotation of the proximal fragment and the variation in flexion of the shaft. To overcome this and to allow adjustment in two planes between the nail and plate, a ball and socket junction has been made between them. The hole in the plate through which the bolt passes is much larger than the diameter of the bolt. This allows adjustment between the two before the bolt is tightened. In addition, the angle of the plate is easily altered by holding it in a sterilised hand vice and then levering it by means of a rod through the bolt hole (Figs. 10 and 11).

After operation the patient begins early quadriceps exercises and knee movements. Nursing is greatly facilitated.
Isteoarthritis before operation.

Fig. 12
Osteoarthritis before operation.

Fig. 13
After operation.
Two complications are worthy of mention. The screw which fixes the nail to the plate may loosen. This occurred in two cases, but provided it is recognised early it is a minor procedure to tighten it.

The second is adduction of the limb. Since all movable hips show some tendency to adduct in the immediate post-operative period, slight over-correction of deformity is desirable.

So far, forty-three patients have been treated by osteotomy and internal fixation, and preliminary results have been encouraging. Nearly half of these are fairly recent however and any conclusions would be premature. Twenty-four patients have been followed up and of these there was either complete or partial relief of pain in twenty-three. Only one patient reported neither relief nor benefit from the operation. Three patients with bilateral osteoarthritis requested an operation on the second hip. Illustrative radiographs are shown in Figures 12 and 13. One patient of twenty-six had attempted to commit suicide because of the severity of his pain: twelve months after osteotomy he took a hiking holiday and walked thirty miles in three days without pain (Fig. 14).

SUMMARY

Conclusions based on forty-six osteotomies show this to be a sound pain-relieving operation for osteoarthritis of the hip. The field of operation has been widened and some of the disadvantages have been avoided by nail and plate fixation. Early results from this method are similar to those from osteotomy and immobilisation in plaster, and it seems likely that the relief of pain will be just as enduring.

REFERENCES