

Result of Tibial Osteomy for Osteoarthritis of the Knee

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ABSTRACT: Twenty-one (18 patients) osteoarthritic knee treated by tibial osteotomy at the Cikini and Setia Mitra Hospitals between 1983 and 1985 were followed for an average one and half years. The patients ranged in age from 52 to 77 years.

Since improvement of pre-existing osteoarthritis is difficult to demonstrate objectively, the result was judged on the basis of subjective rating. We selected relief of pain and improvement of walking ability as our criteria.

Many patients reported that 6-8 months passed before significant improvement or complete relief of pain was noted.

Based on these two criteria, 13 patient (72%) rated the outcome as good, 2 patients (11%) reported no change in pain, and 3 patients (17%) rated was poor.

Tibial osteotomy for osteoarthritis knees in the elderly in our patients gave a fairly good result.

Tibial osteotomy was firstly described as a specific treatment for osteoarthritis of the knee associated with angular deformity by Jackson in 1958.¹ Subsequently, different osteotomy technique has been published.²⁻⁹ The importance of correction of the angular deformity to an accepted ranged has been well emphasized clinically and experimentally, though the precise range differs among authors. All reports agree that correction of the deformity results in lessening of pain on weightbearing.

High tibial osteotomy appeared to offer two principle advantages over the low osteotomy, namely early mobilization and relative freedom from complications.

This study attempts to evaluate the short term results on tibial osteotomy for pain and limited walking ability due to osteoarthritis in the elderly patients, while arthroplasty would have been considered as an alternated choice of treatment.

MATERIALS AND METHODS

Tibial osteotomy for osteoarthritis of the knee was performed on 23 patients at the Cikini and

Setia Mitra Hospitals between 1983 to 1985. Of the twenty-three, only 18 patients were followed. There were 21 knees, of which 19 were varus and two were valgus deformities. Osteoarthritis was found unilaterally in 11 patients and bilaterally in seven patients.

The average age of the patient at the time of operation was 62.5 years (ranged 52-77 years) and the severity of osteoarthritis was slight in 6 cases, moderate in 10 cases and severe in 2 cases.

The main symptom was pain, and the duration was ranged from one and half years to three and half years, with an average of 2, 7 years.

The indication for osteotomy in these patients was disabling pain that was not relieved sufficiently by analgesic and physiotherapy.

A proforma was used to record the details of the patient's condition pre-operatively, intraoperatively and postoperatively. Pain and mobility were graded 1-6 according to the method of Merle D'Aubigne.

The preoperative osteoarthritis was classified as slight, moderate and severe on the basis of roentgenographic findings.

A knee with any narrowing of either the medial or the lateral femorotibial joint space, any sharpening of the joint margins, or any minor osteophytes with even subchondral sclerosis was classified as having slight osteoarthritis. When either the medial or the lateral femorotibial joint space was nearly non-existent and the size of the osteophytes and the amount of subchondral sclerosis were increased with even some subchondral cystic degeneration, the knee was classified as having moderate osteoarthritis.

When narrowing of the cartilage space was complete, the subchondral bone was deformed, and there were large osteophyte, the osteoarthritis regarded as severe.

The extent of deformity was determined from weight bearing roentgenograms and was recorded as the femorotibial angle according to the method described by Bauer et al.¹⁰

At follow up, the method of assessment was the same, in addition, the patients was asked: (1)

whether the pain was less, the same or worse since the operation, and (2) whether the mobility was better, the same or worse. This allowed a subjective record of the results.

Treatment

All osteotomy were performed by removing a wedge of bone and closing the defect through conacellous bone of the proximal tibia at a print between the joint and the tibial tubercle. The size of the wedge to be removed was determined from the weight-bearing roentgenograms. Each millimeter of height of the base of the wedge was assumed to give one degree of correction. Transverse incision was made at the level of tibial tubercle, and the patellar tendon was placed laterally to correct a varus angulation, and medially to correct a valgus angulation. Staples were used as internal fixation.

To eliminate any tethering effect of the fibula, the junction of middle and upper parts of fibular shaft was divided through a separate incision.

Postoperatively; Robert Jones cast was applied for immobilization for period of 2 weeks and quadriceps exercises were begun before operation and continued postoperatively. All patients were encouraged to bear weight as early as possible, usually within one week after operation.

RESULTS

All of the patients were followed up and the time from operation ranged from eleven to twenty-six months with an average of 18 months. We selected relief of pain and improvement of walking ability as our criteria for the success of the treatment.

Relief of Pain

This evaluation is, of course subjective. According to the patients statement, thirteen (72%)

TABLE 1
Post Operative Pain and Severity of Osteoarthritis

Severity of Osteoarthritis	Post operative pain		
	Relief	Same	Worse
Slight	5	1	—
Moderate	7	1	2
Severe	1	—	1
Total	13	2	3

TABLE 2
Post Operative Walking Ability and Severity of Osteoarthritis

Severity of Osteoarthritis	Postoperative Walking Ability		
	Increased	Same	Worse
Slight	5	1	—
Moderate	6	2	2
Severe	—	1	1
Total	11	4	3

had little or no pain, two (11%) partial relief of pain and three (17%) worsening of pain.

Of the six patients with slight osteoarthritis, one had pain as much as before and the remaining were relieved of pain. Patients with moderate osteoarthritis, seven felt no pain, one felt the same and two worsening. (Table 1)

Walking Ability

Eleven patients reported to have significant improvement of walking ability after 6-8 months of operation. These patients needed cane or curches for a period of an average 4 months (ranged 3-6 months). Three patients had a limited ambulation even with support, and was worse than before operation. Three patients had a limited ambulation for long distance with cane or curches as they did before. (Table 2)

Complication

Limited knee motion was found in two cases and were manipulated under general anaesthesia. The immediate result of the manipulation was good in both knees. Superficial wound infection developed in two patients but healed with no suquaelae and there were no deep infection.

Delayed union of the osteotomized size occurred in one knee and reoperation was not however instituted. One knee was overcorrected but the symptom of pain was relieve. A patient with bilateral osteotomy, one knee was under corrected and subsequently fell into varus deformity as before.

DISCUSSION

Since the improvement of pre-existing osteoarthritis is difficult to demonstrate objectively, the success of surgery must be judged largely on the basis of subjective rating.

Although this study does not allow detailed analysis, because of its criteria and the number of patients, it gives us the belief that a simpler procedure, such as osteotomy still has a place in the treatment of osteoarthritis of the knee in elderly patients.

The main purpose of high tibial osteotomy is to shift the weight bearing stress from one femorotibial compartment to the other. In osteotomy for a varus deformity, this is achieved with relative ease by paying proper attention to the femorotibial angle.

In our series, the best results were obtained in varus knees with slight osteoarthritis, a finding consistent with those reported by Coventry and Vainiopa.^{2-4,11}

Of the ten patients with moderate osteoarthritis, two had worsening pain after osteotomy. In one knee, the deformity was valgus and the other had undercorrected osteotomy. The later occurred in a patient who underwent a bilateral operation, the results were considered poor, even though a good contralateral result was obtained.

Bilateral osteotomies were performed in two patients with severe osteoarthritis, one left no pain postoperatively, but no improvement in the walking ability; the other felt worsening of pain and decreased mobility.

Jackson and Wough in 1961, demonstrated clearly that correction of the osteoarthritis deformity by osteotomy relieved pain. The deterioration of the result in one knee with a varus deformity in this study was associated with too small correction and post operative increase in varus defor-

mity, and angulation was not prevented by eliminating the tethering effect of the fibula.

One knee had a valgus angulation as the result of overcorrected osteotomy, but the pain was relieved. Coventry stated that the best result of valgus osteotomy was an overcorrection two to three degrees over the physiological valgus angulation.

In our opinion the effect of the osteotomy is due to mechanical factors, as suggested by Insall et al,⁸ but we can not obtain from our study the degree of femorotibial angle sufficient to prevent later deterioration of the result. Vinopaa suggested that the angle of 170 to 173 degrees may be the most effective correction.

High tibial osteotomy has the advantages that the bone healed rapidly because it performed through a cancellous bone, the correction can be estimated quite accurately from pre operative weight bearing roentgenograms and the risk of delayed union or non-union is minimized when early weight bearing is allowed. We only had one case of delayed union but the result was good.

CONCLUSION

Short term good results of tibial osteotomy were obtained in slight and moderate osteoarthritis of the knee with varus angulation in the elderly patients.

These findings are significant, especially for patients who are definitely opposed to having a replacement arthroplasty and for those who are not capable of providing an implant.

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