

# A compression pinning system for osteochondritis dissecans of the knee

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A new pinning technique for fixation of osteochondritis dissecans of the knee is presented. The system consists of hooked wires, anchoring screws, and bolts, which provide compression to the osteochondral fragments and prevent pin migration. In 10 patients followed for 4 (3-5) years, all the knees had normal, painless function, with complete healing of all but one of the fragments; the exception was a small chondral fragment, which was removed arthroscopically.

We describe a simple modification of the wire pinning technique for osteochondritis dissecans which prevents pin migration and provides compression of the fixed fragments.

## Materials and methods

From 1983 to 1985, all 10 patients with osteochondritis dissecans of the knee treated at our hospital were subjected to fixation of the osteochondral fragments with a new compression pinning technique. The average age was 17 (12-22) years. In the first 4 cases no anchoring screw was used, but because more compression was desirable, the anchoring screw was added to the system. The patients were followed clinically and radiographically with AP, lateral, and notch projections of the affected knee. The average follow-up time was 4 (3-5) years.

### *Surgical technique*

An anteromedial or anterolateral arthrotomy was performed on all the patients depending on the position of the osteochondral fragments. The loose or partially detached fragments were lifted from their beds, the beds were prepared by curettage and cancellous bone grafting, and the fragments were replaced and fixed. Fragments with intact intraarticular surfaces were left in situ, but fixed internally as well. Fixation was achieved by pinning.

The fixation device consists of 1.6-mm wires threaded for their entire lengths except for the proximal 3 cm. The distal end is pointed, whereas the proximal end is smooth and flattened with a 90°, 3-mm-long, L-shaped hook. A wire is drilled at right angles through the replaced fragment from an intraarticular position out through the supracondylar area until its hooked end comes to lie close to the articular surface. The supracondylar area is then prepared with an AO cannulated instrument that fits over the inserted wire (Figure 1).

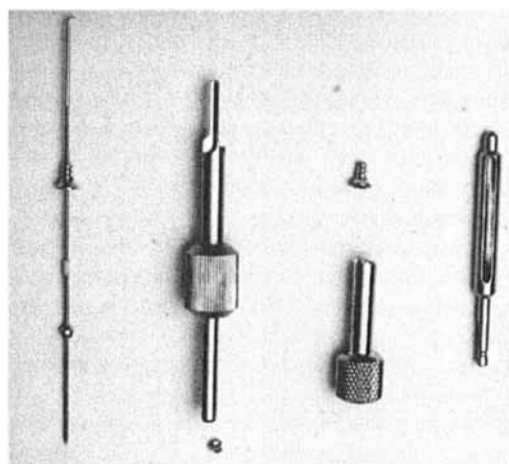


Figure 1. The instrumentation for the compression wiring technique. From left to right, the wire, with anchoring screw, washer, and locking bolt; the hand-held step drill, which also serves as the wrench for the bolt at its proximal end; the screwdriver for the anchoring screw; and the extraction device, which threads over the wire and allows the wires to be pulled out of the supracondylar area.

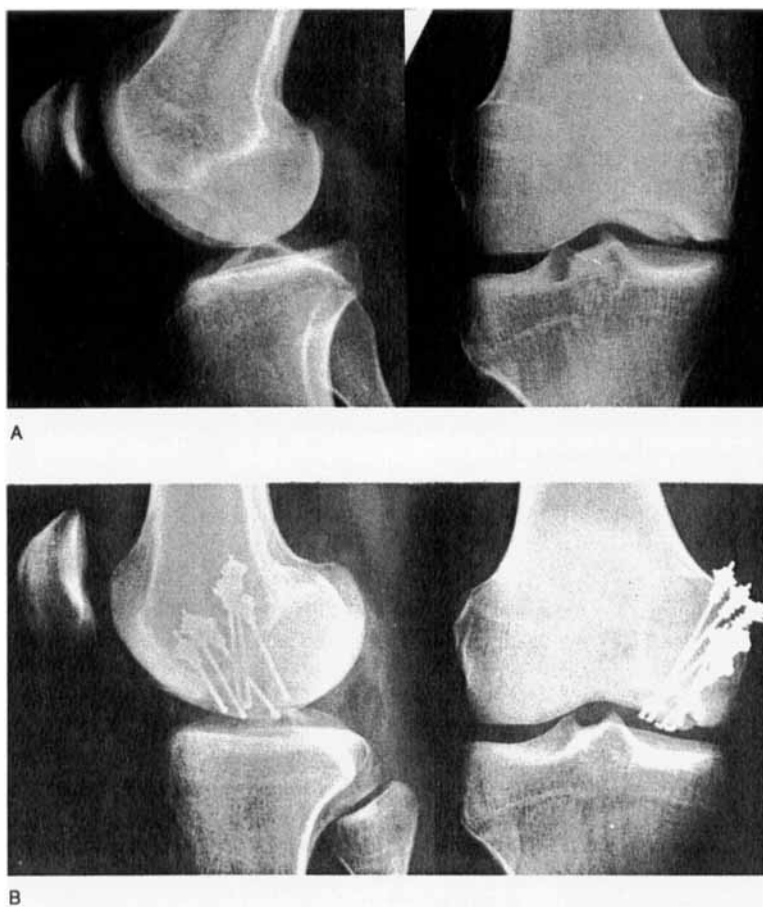


Figure 2. A 20-year-old male with swelling and pain in his right knee.

A. There is one large and one smaller osteochondral fragment on the medial femoral condyle.

B. The two fragments were fixed together with six compression pins. The smaller posterior fragment could not accept two pins, but good stability was achieved.

A hand-held step drill is used to cut the lateral femoral cortex for the anchoring screw, which is also cannulated and is screwed into the femoral bone to provide a firm anchoring point. Finally, the locking bolt is threaded over the wire until it abuts on the anchoring screw, which prevents further advancement of the bolt. Thus, each turn of the bolt over the threads of the wire results in advancement of the pin. As the pin advances, the hook is gradually pulled under the surface of the articular cartilage until it becomes firmly applied against the subchondral bone. With every turn of the locking bolt, compression of the osteochondral fragment in its bed occurs. When firm anchorage of the fragment is achieved, the wire is cut off. As many wires as necessary can be inserted to adequately fix the fragment. A fragment with a surface area of 4 cm<sup>2</sup> could easily accommodate three to four wires.

Postoperatively, the patient is allowed full unrestricted knee motion, and touch 15-kg weight bearing is allowed for 6-8 weeks postoperatively. At that time, the patient gradually begins with full weight bearing.

Once union is attained, the fixation is removed through a portion of the old incision without performing an arthrotomy. In this series of patients, all the knees underwent arthroscopic examination to assess healing and stability of the osteochondral fragments before the wires were removed after about 6 months through a small portion of the previous incision without a repeat arthrotomy.

## Results

There were no complications. The arthroscopic examination did not demonstrate any migration of the pins or any evidence of wear on the tibia. At the 4-year follow-up, all the patients had a full range of motion, no pain, and all the fragments had healed radiographically. (Figure 2). In 1 case the lesions were more chondral than subchondral, so that only one area of the pinned site was healed, and a small unhealed chondral fragment was removed at the time of arthroscopy.

C. Five months later, radiographic union of the fragments was confirmed by arthroscopy. There was no evidence of pin migration. The wires were removed through the old incision.

D. Two years postoperatively, the patient is asymptomatic and his right knee has a full range of motion.



C



D

## Discussion

Deacon (1981) described a technique of fixation of osteochondral fragments with hooked wires by bending the wires in the supracondylar region. This technique was used in 5 patients in our department, and fixation seemed to be augmented as compared with simple pinning. However, because the pins were not firmly anchored, migration of the pins into the joint continued to be a problem. Therefore, a 90° hook was added to one end of the wire, and a locking bolt was used in the supracondylar region. These modifications were followed by the addition of the supracondylar anchoring screws to allow for more compression. These altera-

tions seem to have solved the problems of pin migration, and soft-tissue irritation has not occurred.

Even though the Herbert compression screws are equally effective, they are larger, with a core shaft diameter of 2.4 mm; the number of screws that can be used is limited; and small fragments may fracture. In addition, Herbert screws have been removed as early as 6-8 weeks to avoid having the screws become embedded in the femoral bone. We have the pins in place longer to assure stability of the osteochondral fragments until healing is achieved; the patients in this series routinely had their fixation retained for an average of 6 months.

## References

- Deacon O W. A method of hooked pins for osteochondritis dissecans of the knee. Read at the International Society of the Knee, Meeting 1981.