INTERVERTEBRAL FUSION FOLLOWING LUMBAR DISC EXCISION
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Adequate clinical results from several types of operations for ruptured lumbar intervertebral discs have been reported for some time.1,3,5,9-15 Despite minor variations in technique, only three basic types of operations are performed: 1) disc evacuation plus spinal fusion by bone grafting on the laminae and dorsal spines;1,3,13 2) disc evacuation plus bone graft within the intervertebral space;4,5 and 3) disc evacuation without overt attempts at fusion.2,9,13 The latter type of procedure appears to be gaining popularity.1,3,9,11,18 The need for primary fusion has long been questioned by most neurosurgeons14 and an increasing number of orthopedic surgeons.3,12,13 A satisfactory clinical result occurs in more than half the patients treated, regardless of the type of operation performed. There has been little experimental or clinical evidence presented that firmly establishes the value of fixation of the spine in the usual case of ruptured disc. On the contrary, most clinical evidence suggests that fusion is an unnecessary addition to surgical therapy in the usual case.2,3,12-14

It has been postulated previously that a common critical factor may exist in these three operative procedures that is responsible for the good results claimed in all three groups. The step common to all the procedures is evacuation of the intervertebral disc space. Experimentally, fibrous union of adjacent vertebral bodies occurs following complete evacuation of the disc space in the monkey6,8 and in the dog.7 Intervertebral bony fusion can be produced by curettement of the opposing cartilaginous plates at the time of complete disc evacuation.8 This shows that fusion can occur without the intervention of grafts and that intervertebral fixation may result. The frequency of intervertebral fixation following disc evacuation and curettement of cartilage in the human is unknown. The clinical significance of intervertebral fixation so produced is likewise unknown. Therefore, the present clinical study was designed to determine the presence of intervertebral fixation following disc evacuation with cartilage curettement, and to correlate its occurrence with the clinical result obtained.

MATERIAL AND METHODS

Twenty patients were operated on for chronic recurrent lumbar intervertebral disc protrusion. All patients had had two or more episodes of com-

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plete disability from recurrent low back pain and recurrent sciatica. All patients likewise had unequivocal signs of compression of the lumbar nerve root. All patients were severely disabled by their back pain and sciatica at the time operation was advised.

In all instances no clinical improvement had occurred following at least 5 days of strict bed rest, lumbar stretching exercises, and use of analgesics. Routine pre-operative Pantopaque myelography showed the ruptured disc defect, and laminotomy and disc excision was carried out at the proper level under spinal anesthesia. Care was taken to achieve the maximum removal of the disc possible and thorough curettement of the cartilage plates in the intervertebral disc space was done. After this routine operative procedure was completed and with the wound still open, roentgen-ray marker needles were placed in the lumbar spines of the vertebrae above and below the operative site as well as in a lumbar spine one level above or below the level of the evacuated disc.

After operation, all patients remained at complete bed rest until they were able to move about in bed and hyperextend the back painlessly. Ambulation was then allowed. The time of complete bed rest varied considerably, but the average was about 1 week. The sitting position was not allowed for 2 to 3 weeks.

The patients were discharged 2 weeks following operation and were examined, in so far as possible, at approximately 6 weeks, 3–4 months, 6 months, and 1 year postoperatively. At each examination, lateral upright roentgenograms of the lumbosacral spine were taken in full flexion and full extension. Complete neurological evaluation was likewise done and a full social history was taken with particular emphasis on the type of work being done.

Of the 20 cases originally included in this series, only 10 were carried through the full 1-year follow-up as outlined. Three patients were followed through 6 months, 1 through 4 months, 2 through 2 months, and 4 had no adequate postoperative follow-up. Considerable difficulty was encountered in persuading completely well individuals to travel long distances for these check-up examinations.

Of the 10 patients seen in check-up examinations, 11 had unilateral rupture of the disc at a single level, 4 had unilateral rupture at two levels, and 1 had bilateral rupture at one level.

Roentgenological evidence of intervertebral motion was determined by measuring the change in positions of the needle markers in the lumbar spines during full lumbar extension and during full lumbar flexion. The interspinous movement, as measured by the difference in position of the markers in flexion and extension, was considered to be a reliable index of the degree of intervertebral fixation (Figs. 1, 2, and 3).

At each postoperative examination, the clinical status of the patient was evaluated primarily on the basis of: (1) the amount of pain present, and (2) the type and amount of work the patient was then doing.