

Lumbar Intervertebral Disc Surgery: Review of 300 Cases

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THE first paper to appear in *The Canadian Medical Association Journal* relative to the operative treatment of lumbar intervertebral disc protrusions was a case report written in 1926 by Stevenson,^{1†} entitled "Late Decompression of Lumbar Cord Following Injury". After a decompressive laminectomy at L1-L2, though without removal of the intervertebral disc, the patient improved rapidly from a previous paraparesis.

Removal of lumbar intervertebral discs for the relief of low back and lower limb disability was performed by the author on about 1000 patients between the years 1953 and 1968, when he was associated with the Department of Neurosurgery of the Saint John General Hospital, Saint John, New Brunswick. This report concerns the first 300 of those patients, treated consecutively between February 1953 and February 1960. The results were assessed by a questionnaire sent to the patients and by a detailed survey of their hospital and other follow-up records. This analysis was made in 1965, thus providing at least a five-year follow-up period in most cases.

It should be noted that the patients included in this series were those with low back and lower limb pain and other symptoms, that is, those suffering from what may be termed the "lumbosciatic syndrome". Persons who complained only of back pain (so-called "lumbago"), without true radiation and without neurological deficit, were not included, since they were treated differently.

MANAGEMENT OF THE INDIVIDUAL PATIENT

Most patients had already undergone a trial of conservative treatment (in some cases this was supervised in the Neurosurgery Department), which consisted of the following measures: a period (up to one week) of rest in bed on a firm or boarded mattress; application of

local heat and massage for muscle spasm; appropriate sedative and analgesic medication; gradual mobilization out of bed as soon as tolerated; frequent warm tub baths; and—most important—instruction in a specific regimen of low back and lower limb exercises, which were both flexion and extension in type, and which the patient carried out at least four times daily. Traction was not used in the conservative treatment of these patients.

There was nothing unusual in the preoperative investigation. Appropriate radiographs of the lumbosacral spine and chest were always included; the remainder of the investigation varied with the individual patient and his associated problems, if any. However, when operative intervention was being seriously considered, every such patient was submitted to positive contrast myelography, using iophendylate (Ethiodan).

There were three basic indications—of which *at least two* were required in a given case—for the operative treatment of these patients: (1) persistent significant symptoms which did not respond to adequate conservative treatment, (2) positive orthopedic and/or neurological signs on physical examination, and (3) myelographic abnormality conforming to the rest of the clinical picture. Whenever there was evidence of a severe and potentially disabling neurological deficit, the conservative treatment of the patient was brief or even eliminated. On the other hand, it was recognized that neurological deficit was to be at least expected (even when the orthopedic disability was severe) in patients with fifth lumbar nerve root involvement (in most cases at the level of the L4-L5 disc).

At operation particular attention was paid to adequate exposure, whether this was unilateral or bilateral. When the clinical symptoms and signs were *strictly* unilateral, the operation was usually done from the involved side only; otherwise the procedure was carried out bilaterally. The ligamentum flavum was fully removed, and a generous, though still partial, laminectomy and facetectomy were carried out, uncovering the local nerve root well into its intervertebral foramen. For bilateral exposure the interspinous ligament and portions of the spinous processes were removed, in addition to portions of the laminae and articular facets (but without disturbing the integrity of the lateral articular joints themselves). The disc removal was performed as

Presented in part at the Atlantic Regional Meeting of the Royal College of Physicians and Surgeons of Canada, Saint John, New Brunswick, October 1965; and at a combined meeting of the Canadian Neurological and Neurosurgical Societies, Toronto, Ontario, June 1966.
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radically as possible, whether from the one side or from both sides and across the midline. The vertebral bodies were scraped clean, so that bare bone was left "facing" bare bone at the end of the procedure. The purpose of such radical curettage of the disc interspace was to prevent recurrent protrusion of the same disc at a later date.

The patients were mobilized out of bed on the first postoperative day, and graduated low back and lower limb exercises were resumed at the same time. The exercises were restricted to the extension type until the sutures were removed; then the flexion exercises were added to the regimen, and warm tub baths were instituted. Most patients were discharged from hospital 12 days after the operation.

The postoperative follow-up was an integral part of the management; the majority of patients were reviewed periodically for 7 to 14 months after discharge from hospital. It is important that the return to work be decided by the operating surgeon himself, not by some other physician. Most patients can be back at their jobs about one month after leaving hospital. They were instructed in how to lift correctly, and were encouraged to continue the same exercise regimen regularly—at first four times daily, then less frequently, and finally at least once daily for the rest of their lives.

CLINICAL MATERIAL

The age distribution of the 300 patients (Table I) indicates that two-thirds were in the 31-50 age group. The youngest patient in this series was 16, and the eldest 69. (In subsequent patients these age limits were extended to 14 and 84 years, respectively.)

TABLE I.—AGE DISTRIBUTION OF PATIENTS

20 years or less	4
21-30	38
31-40	122
41-50	88
51-60	37
61-70	11

There was the usual preponderance of males—222 males and 78 females, a ratio of 3:1.

The patients were also categorized as to those who were financially "on their own" and those who were supported, both for the operative treatment and during the convalescent period, by some "third-party" agency. The latter totalled 124, and were divided among the New Brunswick Workmen's Compensation Board (62), the Department of Veterans Affairs (37), the De-

partment of National Defence (16) and the Sick Mariners' Service (9).

Three hundred and seventeen operations were performed on these 300 patients, so that 17 patients underwent two operations, at variable intervals. The operation on nine of the remaining 283 patients was also a second procedure, their first operation having been performed elsewhere. The lumbar interspaces explored are shown in Table II; 303 (95%) of the procedures involved the L4 to S1 area of the spine. In order to verify the consistency of this particular statistic, the next consecutive 200 lumbar disc operations (performed by the author during the years 1960 to 1962) were reviewed. The same relative numbers were noted: 191 at the L4 to S1 levels (again, approximately 95%), five at L3-L4, three at L2-L3 and one at L1-L2.

TABLE II.—LEVEL OF OPERATION (317 OPERATIONS)

L5-S1 unilateral	125
L5-S1 bilateral	15
L5-L6 unilateral	19
L5-L6 bilateral	3
L4-L5 unilateral	82
L4-L5 bilateral	41
L4-L5 and L5-S1 unilateral	13
Other L4 to S1 combinations	5
L3-L4 unilateral or bilateral	8
L2-L3 unilateral or bilateral	2
L1-L2 unilateral or bilateral	4

RADIOLOGY

A. Plain Radiographs

Plain radiographs of the lumbosacral spine of every patient who underwent operative treatment were available for review (Table III).

TABLE III.—PLAIN RADIOGRAPHS OF LUMBOSACRAL SPINE

No significant abnormality	77
Localized disc degeneration (2 levels or less)	82
"Diffuse spondylosis"	36
Transitional lumbosacral vertebra	42
Other (e.g., sacroiliac arthritis, old depressed vertebral body fracture, disc calcification, etc.)	32
No information available at time of file review	67

However, some of these were taken, perhaps at another institution, before the hospital admission during which the operation was performed. Thus, in 67 cases the hospital records did not include a specific description of the radiological findings. Nevertheless, the absence of such a notation may be taken to mean that no significant radiological abnormality had been detected in those radiographs, thus increasing the total probable number of patients in the series without such abnormality to 144 (48%).

The term "spondylosis" is used here to mean an osteoarthropathy of the spine secondary to intervertebral disc degeneration. This may entail a variable combination of disc narrowing, hypertrophic bony changes along portions or all of the disc annulus, similar bony changes in and around the lateral articular joints, and even some degree of spondylolisthesis (without spondylolysis).

Particular attention should always be paid to the so-called "rib count" and the related count of the lumbar vertebrae. The term "transitional lumbosacral vertebra" is applied to a partly or fully sacralized fifth lumbar vertebra, to a partly lumbarized first sacral segment, or to an actual sixth lumbar vertebra (interposed between five true lumbar vertebrae and a normally segmented sacrum). The presence of such a transitional segment at the lumbosacral junction should alert one to the possibility of an atypical neurological deficit, relative to the interspace at which the protruded disc is situated. Moreover, it should make the surgeon particularly careful to identify accurately the interspace or interspaces which he intends to expose at operation. In the presently reported series a posterior disc protrusion was never encountered at the interspace between a bilaterally sacralized fifth or sixth lumbar vertebra and the sacrum. However, in one patient a clinically significant disc protrusion was found between a *unilaterally* sacralized fifth lumbar vertebra and the sacrum (on the side opposite the sacralization).

Postoperative narrowing of a curetted disc interspace was demonstrated radiologically many times, at various intervals after the procedure. In several cases progressive calcification of the narrowed interspace was also observed.

In general, although plain radiographs of the lumbosacral spine are an essential part of the preoperative and postoperative evaluation of patients with the lumbosciatic syndrome, they are not actually helpful in localizing the level of a symptomatic disc protrusion in any given case. If the plain radiographs demonstrate disc narrowing and other changes at the L5-S1 interspace, for example, it is just as possible for the symptomatic disc protrusion to be at L4-L5 as at the radiologically abnormal lumbosacral level.

B. Myelography

Myelography, using the opaque contrast medium Ethiodan and examining at least the lower thoracic and entire lumbosacral regions thoroughly, was carried out in every case before the operation—usually *after* the decision had been made to proceed with operative treatment, rather than merely as part of the general work-

up of every patient presenting with the lumbosciatic syndrome. The reasons for routine preoperative myelography may be listed as follows:

1. The clinical picture is not always clearly diagnostic, even if the vertebral count is of the standard type.

2. The vertebral count is variably anomalous in a substantial percentage of patients, and as mentioned previously, this can result in an atypical neurological deficit relative to the disc interspace involved.

3. Myelography quite frequently demonstrates abnormalities at interspaces other than those which are clinically most significant. Such findings may in certain cases indicate the "prophylactic wisdom" of exploring one or more of these other levels after the major lesion has been removed.

4. In some patients the myelogram demonstrates unexpected marked or complete subarachnoid obstruction, which may require more extensive exposure at operation.

5. A disc protrusion may extend significantly above or below its own plane, or be situated far laterally within the interspace, thereby involving a nerve root at another level, in addition to or instead of the nerve root situated at its own level.

6. In a few patients the myelogram has demonstrated the presence of an unexpected intraspinal tumour, rather than the disc protrusion suggested by the symptoms and signs alone.

It is recognized that some surgeons, on the basis that most disc protrusions requiring operative treatment do occur at either the L4-L5 or L5-S1 interspaces, avoid preoperative myelography in the majority of their cases and explore both these interspaces in every case. However, this too often entails unnecessarily extensive surgical intervention. Exploration of an uninvolved lumbar interspace may well result in at least temporary painful irritation of the disturbed nerve root, and can even lead to troublesome postoperative scarring. Moreover, the interspace where the clinically significant pathological changes are actually present may still be missed.

In the present series, myelography was considered to have been an important factor in planning the site and extent of the operative procedure in 118 cases. Within this group the clinical picture and the myelogram did not conform exactly as expected on 55 occasions; in the other 63 patients the myelogram disclosed a relatively silent but apparently significant disc lesion (in addition to the clinically active protrusion). On only nine occasions was the myelo-

gram not helpful (i.e., falsely negative)—evidently because of the presence of a relatively roomy extradural space, which could accommodate a large disc protrusion without impingement on the subarachnoid space (usually at the lumbosacral level).

The protein content of the cerebrospinal fluid removed at the time of myelography was recorded for all except 18 of the 317 specimens. Thirty-eight fluids contained less than 20 mg. per 100 ml. A normal range of 21 to 50 mg. per 100 ml. was noted in about half of the specimens (154). The protein content was slightly to moderately elevated (51 to 100 mg. per 100 ml.) on 91 occasions; and levels above 100 mg. were reported 16 times. The latter included one of 250 mg. and another of 475 mg. per 100 ml., the lumbar punctures in these cases having been carried out below a completely obstructing disc protrusion, at L2-L3 and L1-L2, respectively.

The author has had no personal experience with discography, and therefore cannot fairly compare the value of this procedure with that of myelography in the preoperative investigation of patients with the lumbosciatic syndrome. In his hands, myelography has been an effective diagnostic aid, with relatively little morbidity and no apparent complications. However, it is quite possible that the reported greater risk and morbidity of discography are worth incurring in the investigation of certain patients with unremitting *non-radiating* back pain, since in these cases myelography is frequently not helpful in allowing a decision to be reached as to their further management.

SURGICAL PATHOLOGY (Table IV)

When the annulus of the protruding disc is still in continuity, though it may be extremely thin, the protrusion is called "bulging". The term "ruptured" protrusion is applied when there is an actual opening in the annulus, permitting extrusion of internal disc material into the adjacent extradural space. At times such a rupture occurs through an opening in the periosteum of the posterior aspect of the vertebral body above or below the abnormal disc, the extruded disc tissue having migrated from its interspace, beneath the periosteum, in an upward or downward direction.

A unilateral ruptured protrusion was encountered at 159 operations. The protrusion was a unilateral bulging one on 89 occasions. A midline ruptured protrusion was found in 14 patients, whereas the protrusion was transverse or bilateral in 27 patients. Most of these protrusions were accompanied by a variable degree of extradural fibrosis, with resultant variable

adherence of the outgoing nerve roots to the surrounding structures in the spinal canal. At times the fibrosis was minimal; on other occasions it was marked—usually in conformity with the duration of the patient's disability.

A so-called "chronic picture" was observed in 18 patients. This term was applied when the pathological changes consisted of a moderate to marked degree of disc degeneration, with or without some (usually a slight) degree of posterior protrusion, while the confinement of the local extradural space was chiefly due to abnormal proximity of the local bony structures, thickened ligamentum flavum and severe extradural fibrosis.

TABLE IV.—TYPES OF SURGICAL PATHOLOGY
(317 OPERATIONS)

Unilateral ruptured protrusion, with variable extradural fibrosis.....	159
Unilateral bulging protrusion, with variable fibrosis....	89
Midline ruptured protrusion, with variable fibrosis....	14
Transverse (bilateral) bulging protrusion with fibrosis	27
"Chronic" pathology.....	18
Extradural fibrosis only:	
—postoperative.....	4
—apparently post-traumatic.....	2
Gross inflammation of nerve root (additional).....	13
No definite pathology.....	4

Extradural scarring alone was the major pathological lesion in six patients. This was concluded to be postoperative in nature in four patients (all of whom underwent the primary operation elsewhere), and apparently post-traumatic (the result of relatively recent trauma) in the other two.

In 13 cases an additional pathological finding was gross inflammation of the involved nerve root, which appeared swollen and hyperemic when it was first exposed. In only four of the 300 patients were the findings at operation concluded to be within normal limits.

As indicated previously, 26 of the 317 operations were second procedures. In 17 the pathological process was unrelated to the condition treated at the first operation; i.e., the abnormality of the "second disc" was regarded as having developed at some later date. In five patients it was concluded that the lesion treated at the second procedure had either been recognized but not treated, or actually missed, at the time of the first operation, the resultant disability having become exacerbated subsequently. The remaining four patients in this group were those whose recurrent disability was considered to be due to postoperative extradural scarring alone, a direct complication of the first procedure.

COMPLICATIONS

There were no operative or postoperative deaths.

Infection of the operative site developed in only three patients. These infections, all due to *Staphylococcus aureus*, occurred in persons already harbouring an infection from the same organism at the time of operation—in one case beneath the fingernails, in another in the lungs, and in the prostate in the third. The convalescent period was considerably prolonged in these patients, but the final outcome was satisfactory.

In the remainder of the lumbar disc removals performed at the Saint John General Hospital under the author's supervision (about 700 additional operations), there was only one additional wound infection (again in a patient with an unrecognized pre-existing infective process). This low infection rate, achieved in a hospital where the incidence of wound infection on the general surgery wards was considered to be within more "standard" limits, deserves some comment. The patients described in this report were treated under rather unusual conditions. Their beds were localized to a single area of the hospital. Because of the absence of sufficiently trained resident or intern help, practically all of the procedures carried out on the patients, including most of the dressing changes, were done by the author himself. A detailed regimen of skin care was rigidly followed—before, during and after operation—with the help of a cohesive staff of excellent nurses. Moreover, the dressings were changed in a special "dressing room", rather than on the wards. The operative sites were not routinely cultured, but the absence of wound infection in all but four of these patients means that their wounds were healing primarily when the skin sutures were removed on the sixth or seventh postoperative day, and that they continued to heal thereafter, without requiring any further specific care.

Thrombosis of a saphenous vein occurred postoperatively in one patient; this was treated surgically and cured. Bilateral thrombosis of the ophthalmic veins developed in one polycythemic patient; fortunately this complication resolved spontaneously without affecting his visual acuity. Finally, there was a single instance of permanent nerve root damage, occurring in a patient with a ruptured L5-S1 protrusion accompanied by extensive extradural fibrosis. The nerve root anatomy turned out to be anomalous in this case, an aberrant root crossing the extradural space in a horizontal direction just above the obliquely directed first sacral nerve. The horizontal nerve was partly interrupted as the extra-

dural scar tissue was being cleared, having itself been mistaken for a fibrous band. The resultant muscle atrophy in the affected lower limb gradually improved during the subsequent year, and the operative result could eventually be classed as good. Similar anomalous nerve root anatomy was encountered on several subsequent occasions, but this was recognized before any damage was again done to such aberrant roots.

RESULTS

The duration of the author's personal follow-up of these 300 patients varied considerably. The majority (200 patients) were reviewed periodically for 7 to 14 months after operation. Only six patients did not return for review after discharge from hospital. Fifty-four patients were followed up for one to six months, and in 40 cases the personal follow-up continued for more than 14 months (up to nine years in one instance).

TABLE V.—QUESTIONNAIRE

1. Are you presently satisfied with the result of the operation on your back? (Answer Yes, No or Partly)
2. If your answer to Question 1 is No or Partly, is this because:
 - (a) You still have back pain? (Yes or No)
 - (b) You still have leg pain? (Yes or No)
 - (c) You are bothered by leg weakness? (Yes or No)
 - (d) You are bothered by leg numbness? (Yes or No)
3. (a) Are you working at present? (Yes or No)
 - (b) If you are not working, is this because of your back trouble? (Yes or No)
 - (c) If you are working, did you have to change your job to a lighter one because of your back? (Yes or No)

Tables V and VI relate to the questionnaire which was mailed to all 300 patients in the spring of 1965. Table VII indicates the criteria used in assessing the results, and in Table VIII the results themselves are detailed for the various patient groups. A total of 282 patients (94%) were concluded to have achieved a satisfactory (excellent or good) result.

It is acknowledged that 84 patients did not respond to the questionnaire. However, there were other means of assessing fairly the results in these cases. Some of them were in the group of 40 patients who were followed up personally

TABLE VI.—RESPONSE TO QUESTIONNAIRE
(SUMMER 1965)

	%
Independent patients	140/176 = 80
Workmen's Compensation Board patients	44/62 = 70
Department of Veterans Affairs patients	19/37 = 50
Department of National Defence patients	5/16 = 30
Sick Mariners' Service patients	8/9 = 90
TOTAL	216/300 = 72

TABLE VII.—RESULT CATEGORIES

Excellent:	Asymptomatic, or occasional minimal residual symptoms—pursuing normal occupation.
Good:	Mild residual symptoms—pursuing normal occupation; or doing lighter work because of symptoms.
Fair:	Severe (incapacitating) pain relieved, but still having significant symptoms—unable to work, or doing variable lighter work of necessity.
Poor:	Not relieved of major preoperative symptoms, or worse since operation.
Excellent and good results—satisfactory.	
Fair and poor results—unsatisfactory.	

for up to nine years. More significantly, where the non-responding patients belonged to one of the third-party-coverage groups, the appropriate files were obtained from these agencies and carefully reviewed before coming to a conclusion regarding the individual results. It is possible that some of the patients went elsewhere for treatment of their back ailments in the interval since their operations; this information was not elicited by the questionnaire. However, it should be realized that the Department of Neurosur-

TABLE VIII.—RESULTS

<i>Patients</i>	<i>Excellent</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>
Independent (176).....	154	19	3	nil
Workmen's Compensation Board (62).....	43	14	3	2
Department of Veterans Affairs (37).....	27	2	4	4
Department of National Defence (16).....	15	nil	1	nil
Sick Mariners' Service (9)....	8	nil	1	nil
Total with third-party coverage (124).....	93	16	9	6
OVERALL TOTALS.....	247	35	12	6

gery at the Saint John General Hospital was the only such department in New Brunswick during the period in question, and that the liaison between the author and the patients treated in the department, as well as with their referring physicians, was a much closer one than usually obtains under different circumstances. It may therefore be stated that the conclusion as to the operative result in each of these 300 cases was reached only after a rigid assessment of *all* the available data, and that no patient was placed in the 94% "satisfactory result" category if there was any doubt.

Of the 26 patients who had two operations, only three underwent lumbosacral fusion at the second procedure. In these the result was excellent in one and good in the other two. The other 23 patients merely had additional disc removals at the second operation, and here the results

were excellent in 14, good in seven, fair in one and poor in one.

Lumbosacral fusion is not indicated as a primary procedure in the treatment of patients with the lumbosacral syndrome. It does become necessary, as a secondary operation, when symptomatic instability of the lumbosacral spine develops at some time after the disc removal, and its need should then be determined on the merits of the individual case. Two of the three fusions in the present series followed multiple disc removals, whereas only one patient developed sufficient instability to necessitate fusion after removal of a single lumbar disc (L4-L5, removed bilaterally).

Briefly analyzing the 18 unsatisfactory results, it is noteworthy that 15 of these patients had some form of third-party financial support. Moreover, in 14 the *objective* operative result was regarded by the author as being reasonably satisfactory at the time of the final follow-up examination, in contradistinction to the patients' claims of dissatisfaction, which they expressed either at the final examination or when responding to the questionnaire. That is, though their functional results were recognized as being unsatisfactory and classified as such, it was suspected that the so-called "compensation factor" might well be significant in these cases. On the other hand, there were four patients in whom the final outcome was clearly unsatisfactory, both subjectively and objectively, and these turned out to be the ones in whom the findings at operation were within normal limits (Table IV).

Summary A consecutive series of 300 patients who underwent operations for lumbar disc removal have been reviewed, employing a questionnaire sent to these patients at least five years after their first such operation, as well as submitting their hospital and other files to careful scrutiny. These cases were studied from multiple standpoints—category of patient, level of operation, significance of plain radiological findings, importance of preoperative myelography, cerebrospinal fluid protein content, varieties of surgical pathology, complications—and the pertinent data in all these respects are included in this report. The management of the individual patient is described, and the results of the 317 operations performed on the 300 patients are detailed and analyzed. A 94% "satisfactory result" rate was achieved.

On the basis of this review, the author has reached the following conclusions:

1. Plain radiographs of the lumbosacral spine, though necessary in ruling out other lesions, are not really helpful in diagnosing the presence or level of a surgically treatable intervertebral disc

protrusion of the lumbar spine. On the other hand, positive contrast myelography is of great assistance in the preoperative investigation of patients presenting with the lumbosciatic syndrome; it should not be used as a routine diagnostic procedure in all such patients, but reserved for those persons in whom operative intervention is being seriously considered.

2. Lumbar disc removal (performed unilaterally or bilaterally, depending on the clinical picture) is a most satisfactory operation for the management of patients with persistent low back and lower limb pain, with or without neurological deficit.

3. Bone graft or any other type of fusion of the lumbosacral spine is not indicated in these cases as a primary procedure; moreover, fusion as a secondary procedure becomes necessary in only a small percentage of these patients.

Résumé L'auteur a passé en revue une série de 300 cas consécutifs d'ablation chirurgicale de disques lombaires. A cet effet, il a envoyé un questionnaire à ces malades, cinq ans au moins après leur première opération, et a étudié avec grande attention les dossiers hospitaliers et d'autres sources de renseignements. Ces cas ont été étudiés à de multiples points de vue: catégorie du malade, niveau vertébral de l'opération, signification des constatations radiographiques simples, importance de la myélographie pré-opératoire, teneur en protéine du liquide céphalorachidien, variétés de la pathologie chirurgicale et complications. Le rapport contient toutes les données pertinentes à

ces divers égards. On y décrit le traitement individuel et on donne en détail les résultats de 317 opérations pratiquées sur les 300 malades. On est ainsi arrivé à obtenir des résultats satisfaisants dans 94% des cas.

Se basant sur ce travail, l'auteur formule les conclusions suivantes:

1. Les radiographies simples de la colonne lombosacrée, bien qu'elles soient indispensables pour éliminer d'autres lésions, ne sont pas réellement utiles pour diagnostiquer la présence—ni même son niveau anatomique—d'une protrusion discale opérable de la colonne lombaire. Par contre, une myélographie de contraste positive est précieuse pour l'étude pré-opératoire du malade souffrant de lumbosciatique. Il ne peut être question d'employer cette méthode diagnostique chez tous les malades de ce type, mais on devra la réserver aux malades chez lesquels on considère sérieusement d'intervenir.

2. L'ablation d'un disque lombaire (unilatérale ou bilatérale, selon le tableau clinique) est l'opération la plus satisfaisante à pratiquer chez les malades ayant une lombalgie rebelle et une douleur persistante du membre inférieur, avec ou sans déficit neurologique.

3. La greffe osseuse ou tout autre type d'arthrodèse de la colonne lombosacrée n'est pas indiquée dans ces cas comme opération primaire; du reste, l'arthrodèse, comme opération secondaire, ne s'impose que chez un nombre restreint de ces malades.

REFERENCE

1. STEVENSON, W. O.: *Canad. Med. Ass. J.*, 16: 563, 1926.