

Direct repair of lumbar spondylolysis

10-year follow-up of 12 previously reported cases

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Direct repair of the pars interarticularis defect in lumbar spondylolysis had been performed on 12 patients (mean age 29 years). After an average follow-up

period of 10 years, 10 patients had a good result, 1 fair but improved and 1 poor with unchanged complaints.

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The majority of patients with symptomatic spondylolysis and mild spondylolisthesis can be treated conservatively, but those who remain symptomatic may benefit from operation. Especially in the cases without degenerative changes, direct repair of the lysis lesion (Buck 1970) seems an attractive alternative to fusion procedures. We report the long-term results of local screw fusion repair of lumbar spondylolysis in 12 patients, first reported by van der Werf et al. (1985).

Patients and methods

In the period 1981–1983, 9 men and 3 women underwent a direct repair of the defect in lumbar spondylolysis, 10 of isthmic type and 2 dysplastic (van der Werf et al. 1985). No patients had defects at more than 1 level, and in 1 patient there was a unilateral defect at L5. None of the patients had neurological symptoms and in all patients preoperative discograms were performed.

All 12 patients were reviewed, on average 10 (9.5–11) years after operation (Table 1). The patients were asked about complaints, the presence of residual pain or other symptoms, and if they had returned to normal work or to school. Sporting activities were noted and, in addition to the clinical examination, AP, oblique and flexion/extension radiographs of the lumbar spine were obtained.

10 of the 12 patients had a good result. 2 of them had changed to another job which was less demanding on the lower back. Cases 8 and 9 had had nonunion; the screws were not placed correctly. After reoperation 2–3 years after the index operation, both patients had full consolidation. Case 7 was rated as poor. 3 years after her Buck operation she had been reoperated else-

where with posterolateral fusion from L4 to S1. At the follow-up she had solid L4–S1 fusion and complete healing of the L4 lysis. Nevertheless, she still had the same complaints as before the first operation. Radiographically there was a more than 50 percent narrowing of the L4–5 disc, pointing to a discogenic source of her pains, notwithstanding her sound posterolateral fusion. Except for Case 7, no narrowing of the underlying disc was seen at follow-up nor any degenerative changes or further forward slipping at the operated level (Figure 1). However, Cases 8 and 10 had narrowing of the disc above the operated level.

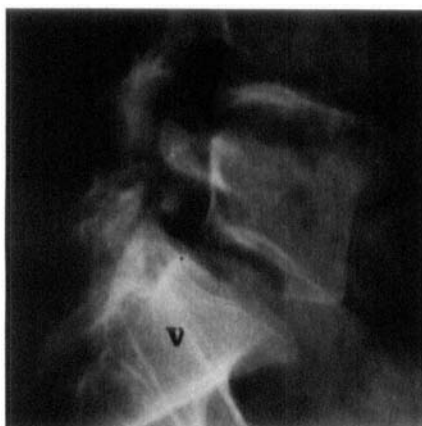
Discussion

From a mechanical point of view it is evident that the neural arch contributes to the stability of the spine. In patients who have spondylolysis, pain in the back is

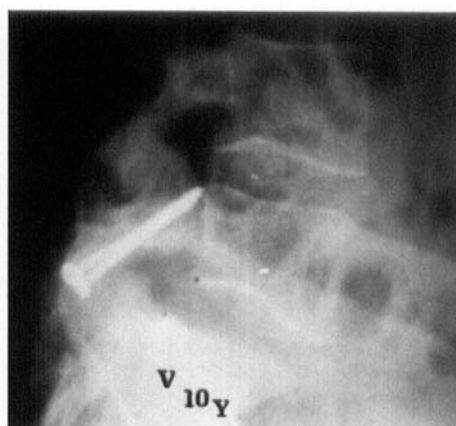
Table 1. Results

Case	Sex	Age at operation	Level	Slip (mm)	Result
1	M	33	L5	0	Good
2	M	22	L5	2	Good
3	M	34	L5	1	Good
4	M	29	L5	4	Fair
5	M	39	L5	0	Good
6	M	37	L4	0	Good
7	F	21	L4	1	Poor
8	M	34	L5	4	Good
9	F	25	L4	0	Good
10	M	19	L5	3	Good
11	M	31	L5	0	Good
12	F	16	L5	1	Good

Figure 1. Case 1. A 33-year-old man, 10 years after direct repair of L5 lumbar spondylolysis.



Before operation.



After 10 years; still normal L5-S1 disc height.

likely to be due to instability and motion of this loose arch. It seems logical that when these patients reach adulthood, secondary changes will occur in the underlying discs. Schlenszka et al. (1991) reported pathological discs in all teenagers with isthmic L5 spondylolisthesis. Erkontalo et al. (1989), who did an MRI study on healthy 14-year-old schoolchildren, reported premature disc degeneration in a quarter of an asymptomatic group and in nearly half of the children with a history of low back pain. This high frequency of disc degeneration reported in children without spondylolisthesis is even more surprising.

On the other hand Paajanen et al. (1989), using MRI, detected a much lower prevalence of degeneration (8 out of 14 cases) of the disc below a spondylolisthesis. Further, Szypryt et al. (1989) failed to find an increased prevalence of disc degeneration in their patients with spondylolysis or mild spondylolisthesis under the age of 25; they therefore concluded that disc failure is not initially an integral part of the condition. However, patients over 25 years in their study had a definitely increased prevalence of disc degeneration below the level of the defect.

In our material a normal discogram was an inclusion criterion for the Buck operation and it still is. Besides, there may be other reasons that can explain the difference in percentage of disc degeneration in our series. First, our criteria for disc degeneration on discography were at that time not as exact as they are nowadays and, secondly, the L5 slip in the age group under 25 in our series is much smaller than in the group studied by Schlenszka et al. (7.5 ± 3.3 percent versus 33 ± 22 percent), indicating a better state of the underlying disc.

Improper placement of the screws appears to be the major cause of the early failures in our series; but reoperation and replacing the screws in the proper position will lead eventually to complete healing. Apart from placing the screws properly, it is also essential to remove the fibrous tissue and the sclerotic bone thoroughly at the site of the defect. Buck (1970) himself stressed the technical difficulties of accurate screw placement, and this was the reason why other surgeons used the wiring technique (Johnson and Thompson 1992) or a specially developed hookscrew (Hefti et al. 1992). In his original report Buck (1975) stated also that the method probably is applicable only when the gap in the neural arch is less than 3 or 4 mm wide. Theoretically, however, the only relevant factor should be an intact underlying disc. Considering previous reports, extending the indication for this method to patients who have a spondylolisthesis or a defect of the pars interarticularis as large as 10 mm, did not seem to compromise the results (Jakab 1977, Pedersen and Hagen 1988).

However, the most interesting finding at follow-up was that after a mean period of 10 years only one of the patients had any degenerative changes or narrowing of the operated level. In one way, this confirms the healthy state of the underlying disc, also after 10 years, and at the same time it could strengthen the assumption that the development of degenerative arthrosis of the lower back in this kind of patient is not commoner than in the normal population. Our observations suggest that there is no reason to set an upper age limit for direct repair of spondylolysis, so long as a discogenic or degenerative origin of the complaints is excluded.

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