Acta orthop. scand. *49*, 158–163, 1978

LUMBAR INTERVERTEBRAL DISC HERNIATION IN THE YOUNG

H. RUSSWURM, I. BJERKREIM & E. RONGLAN

Sophies Minde Orthopaedic Hospital, University of Oslo and
Kronprinsesse Märtha's Institute, Oslo, Norway

A survey of 37 young patients, 10 to 18 years of age, with lumbar intervertebral disc herniation is presented. Local physical findings and limitation in straight-leg raising are often more marked in the young than in adults, whereas pain may be slight or even absent. Neurological findings were normal in 40 per cent of the cases, and when deficits were found, they were usually of a minor nature. Herniated disc syndrome in children and adolescents is characteristic and should not be difficult to recognize. With surgical treatment good results were obtained in nearly all cases.

Key words: disc herniation; lumbar spine; children; adolescents

Accepted 17.x.77

Wahren in 1946 was the first to report surgical treatment for lumbar intervertebral disc herniation in a child. Since then few papers on this subject have appeared in the literature. Lumbar disc herniation in children and adolescents is uncommon; the incidence varies between 0.4 per cent (Webb et al. 1954) and 1.3 per cent (O'Connell 1960) of all cases of disc herniation.

Our impression is that recognition of this syndrome often is delayed in teenagers. The reason may be that symptoms and signs in this age group differ from those in adults, as found by Rugtveit (1966) and Day (1967). Because of its rarity physicians may pay too little attention to this syndrome in the young (Weiss & Raskind 1967, Bradford & Garcia 1971).

The purpose of the present investigation is to draw attention to this condition in young patients, in order to encourage earlier diagnosis and treatment.

MATERIAL AND METHODS

The material consists of 37 cases of lumbar intervertebral disc herniation in patients below 18 years of age, treated in Sophies Minde Orthopaedic Hospital or in Kronprinsesse Märtha's Institute, from 1965 to 1976. During the same period a total of 1016 patients were treated for sciatica.

All of the 37 patients were examined by an experienced neurologist, and in all a radiculography was performed. In 36 patients the diagnosis was verified by operation. One patient with distinct clinical findings and a positive radiculography refused operative treatment.

All patients were given a follow-up examination. The survey is based on information obtained from the records and a re-examination of the radiographs.

RESULTS

The age and sex distribution is shown in Figure 1. The two youngest patients were 10

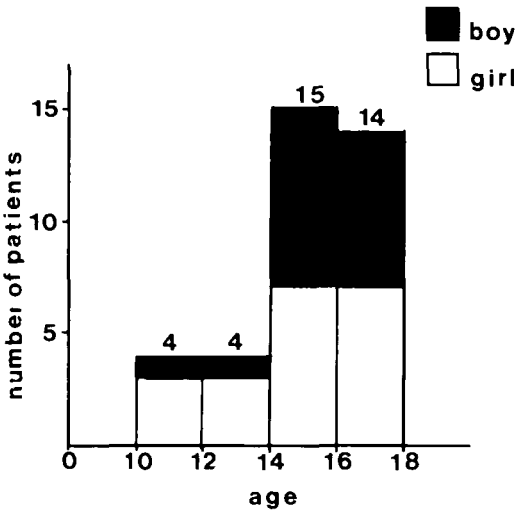


Figure 1. Age and sex distribution in 37 patients with lumbar intervertebral disc herniation.

years old. Serious low back pain, sciatica or both, were the main symptoms in 24 patients while nine felt only slight pain, and four had no pain at all (Table 1). In eight cases the pain was localized to the leg only. Postural disturbances were the major complaint in nine patients, back stiffness in three and gait problems in one of the patients.

Ten of the patients had a history of major trauma.

The duration of the symptoms before definitive diagnosis and treatment varied between 3 months and 6 years, on average 20 months.

The correct diagnosis was made by the referring physician in only 14 of the patients, while scoliosis was suggested in 9 cases (Table 2).

Clinical examination revealed abnormality of posture, spasm of the erector spinae muscles and reduced mobility of the spine in all patients (Table 3). Nineteen presented with an obvious scoliosis. A distinct kyphosis was found in six patients and the rest had decreased or straightened out lumbar lordosis. The straight-leg raising test was positive in all cases being limited to 30° or less in 34 cases. A crossed positive elevation test of 20–80° was found in 24 patients. Three

Table 1. Dominating symptoms in 37 young patients with lumbar intervertebral disc herniation.

Pain		24
Back pain only	7	
Back pain and leg pain	9	
Leg pain only	8	
Postural disturbances		9
Back stiffness		3
Gait problems		1

Table 2. Diagnosis on referral in 37 young patients with lumbar intervertebral disc herniation

Sciatica	14
Scoliosis	9
Back pain	5
Leg pain	3
Abnormal gait	2
Back stiffness	2
Hip disease	1
Bechterew's disease	1

patients had a markedly restricted straight-leg raising test without any feeling of pain.

Neurological examination was completely normal in 15 patients (Table 3). When a neurological deficit was found it was usually of a minor nature.

Radiographs of the lumbo-sacral spine revealed congenital abnormalities in 12 patients, asymmetry of the distal lumbar vertebra in eight and spina bifida in four cases. Radiculography was positive in all patients, at the L4–L5 level in 22 and at the L5–S1 level in 15. In a few patients a short and widened nerve root sheath was the only pathological finding.

Conservative treatment was tried initially in 29 of the patients. Eventually, all but one were treated surgically. A laminectomy was performed at one level, on one or both sides. Operative findings correlated well with the radiculographs. Free disc herniation or definite disc protrusion were found on one side only, in all cases. In two patients the bulging disc contained a grumous fluid. Histological examination of the removed disc was not performed.

Table 3. Comparison of the physical findings in teenagers and adults with lumbar intervertebral disc herniation

	Present series (37 young people)		Røvig (1949) (100 adults)
	No.	Per cent	Per cent
List			93
List or scoliosis	37	100	
Distinct scoliosis	19	51	
Kyphosis or decreased lumbar lordosis	37	100	88
Reduced mobility of spine	37	100	100
Muscle spasm	37	100	100
Straight-leg raising positive	37	100	98
Straight-leg raising 30° or below	34	92	56
Abnormal gait	9	24	
Neurological findings			
Normal	15	41	
Muscle atrophy or hypotony	16	43	94
Paresis	11	29	38
Sensory deficit	8	21	76
Depressed or absent tendon reflexes	4	10	54
Disturbance of bladder function	0		12

There were no surgical complications, and the immediate result was most satisfactory as far as relief of pain was concerned. The spinal contractions gradually disappeared spontaneously in all but one patient, whose persisting scoliosis was treated successfully by a corrective plaster cast (Figure 2).

The follow-up period ranged from 10 years to 6 months with an average of 5 years and 6 months. The result was good in 31 patients who had no subjective symptoms and normal objective findings. Five patients had minor complaints. One patient had relapse of back pain and sciatica and was reoperated a few months after primary surgery. Radiculography showed changes suspected of being disc herniation at the same level as before. At surgery nerve root adhesions were found, but no disc herniation or protrusion.

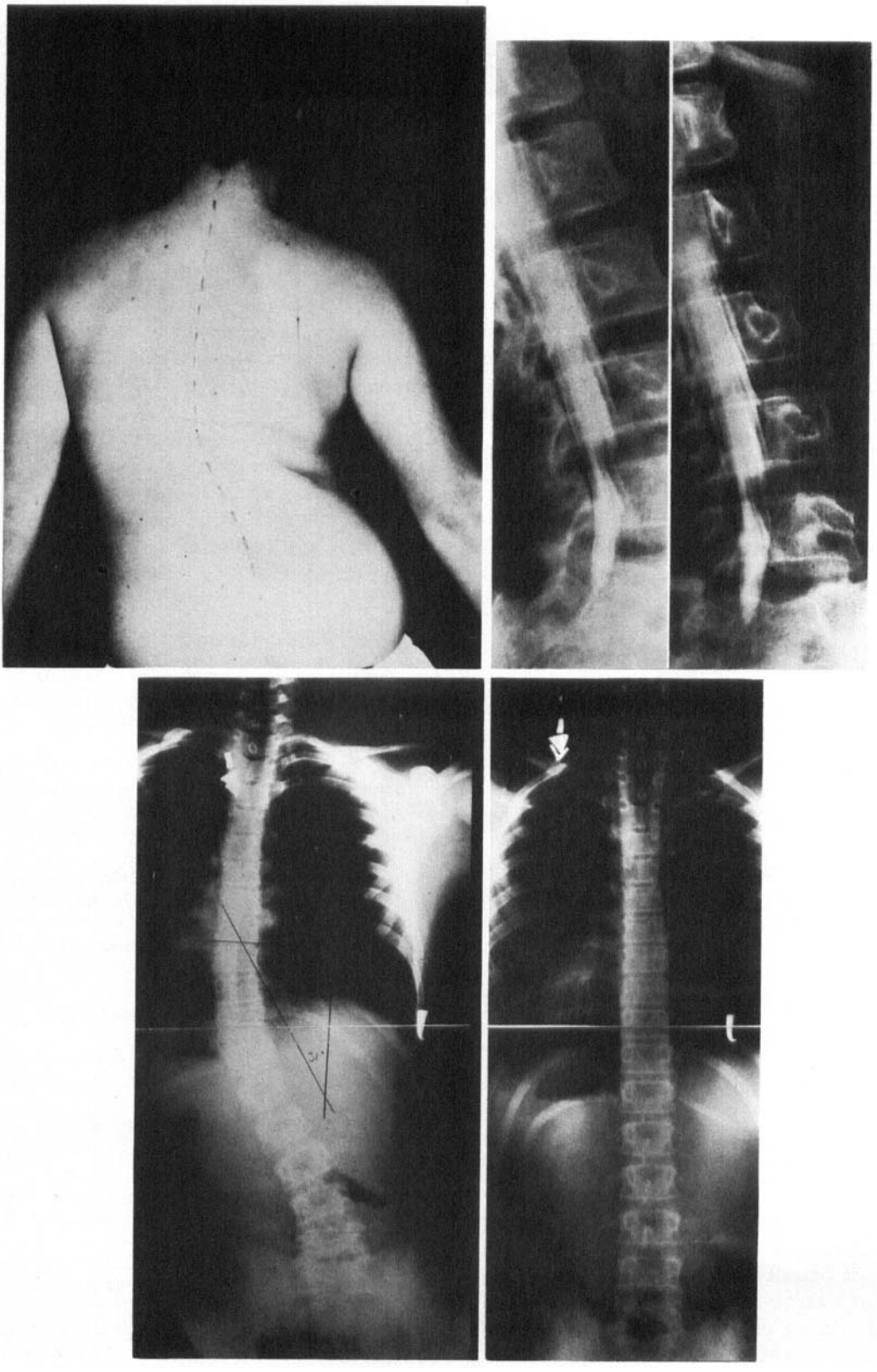
DISCUSSION

The proportion of teenagers among all patients treated for lumbar intervertebral disc herniation was 3.6 per cent which is relatively high. However, a selection has probably taken place, because patients with scoliosis and other special back problems have been referred to our hospitals from regions outside the ordinary referral area. There was a slight preponderance of females, whereas males predominate in most other series of disc herniation in both young people (Bradford & Garcia 1971) and adults (Røvig 1949).

Trauma was frequently present in the history of our patients. Most authors have made the same observation.

Nelson et al. (1972) found no significant difference in the occurrence of trauma as a precipitating factor in disc disease among young people and adults. Trauma is probably

Figure 2. An 11-year-old boy referred with a diagnosis of scoliosis. He had no pain at all. He presented with a left-sided thoraco-lumbar scoliosis of 30° (a,c) and spasm of the erector spinae muscles. The straight-leg raising test was positive at 10°. Radiculography showed disc herniation on the right side at the L_4–L_5 level (b). Three months after surgery the scoliosis was unchanged, but the spine straightened after treatment in a corrective plaster cast (d).



not the only cause of intervertebral disc herniation, as the disc is not the weakest part of the spine (Brown et al. 1969), and disc degeneration may start early in life.

Conflicting information exists as to whether or not symptoms and signs differ in children and adult patients suffering from intervertebral disc herniation. Some authors have stressed that while symptoms are often minor, objective findings dominate in children (Rugtveit 1966, Day 1967). Others have found no significant differences between young people and adults as regards symptoms and signs (Epstein & Lavine 1964, Weiss & Raskind 1967).

Pain was the main symptom in only 24 of our patients; four had no pain at all, whereas pain is the dominating complaint in nearly all adult patients (Røvig 1949). Other discomforts such as postural disturbances and back stiffness are also felt in the great majority of adults.

Clinical examination revealed impressive pathological findings in all cases, viz. scoliosis, kyphosis or reduced lumbar lordosis, limitation of spinal movement and muscle spasm. A markedly restricted straight-leg raising test was also typical in cases of intervertebral disc herniation in young patients. The test was positive also in patients without irradiating pain, and limitation was not always accompanied by pain. Similar observations were made by Key (1950).

Røvig (1949) made a clinical study of 100 adult patients with lumbar intervertebral disc herniation. He also found distinct physical signs (Table 3). However, obvious scoliosis and markedly restricted straight-leg raising test were more frequent in younger patients, while positive neurological findings were more frequent in adults. In our series the neurological deficits were of little significance.

Though there are no essential differences in symptoms and signs in young as opposed to adult patients with disc herniation, it seems that local physical findings and limitation in straight-leg raising tend to be more marked while pain may be slight or even absent in young people. Also there is an obvious contrast between the clincial impression of nerve root compression and the modest neurological deficits in teenagers. These differences in the symptoms and signs in the two age groups may be explained by the more mobile spine of the young preventing nerve root pressure.

The intervertebral disc herniation syndrome in children and adolescents is characteristic, and it should not be difficult to recognize provided awareness of the syndrome is aroused.

It is our experience that non-operative treatment often fails in teenagers. The results of surgery, however, were gratifying. This is in accordance with most authors (Nelson et al. 1972, Bulos 1973) though Taylor (1971) found that the results of surgery were far from satisfactory.

REFERENCES

Bradford, D. S. & Garcia, A. (1971) Lumbar intervertebral disc herniations in children and adolescents. *Orthop. Clin. N. Amer.* **2,** 583–592.

Brown, T., Hansen, R. J. & Yorra, A. J. (1957) Some mechanical tests on the lumbosacral spine and particular reference to the intervertebral disc. *J. Bone Jt Surg.* **39**-A, 1135–1164.

Bulos, S. (1973) Herniated intervertebral lumbar disc in the teenager. *J. Bone Jt Surg.* **55**-B, 273–278.

Day, P. L. (1967) The teenage disc syndrome. *Sth. med. J. (Bgham, Ala.)* **60,** 247–250.

Epstein, J. A. & Lavine, L. S. (1964) Herniated lumbar intervertebral disc in teen-age children. *J. Neurosurg.* **21,** 1070–1075.

Key, J. A. (1950) Intervertebral – disc lesions in children and adolescents. *J. Bone Jt Surg.* **32**-A, 97–102.

Nelson, C. L., Janecki, C. F., Gildenberg, P. L. & Sava, G. (1972) Disc protrusions in the young. *Clin. Orthop.* **88,** 142–150.

O'Connell, J. E. A. (1960) Intervertebral disk protrusions in childhood and adolescence. *Brit. J. Surg.* **47,** 611–616.

Røvig, G. (1949) Rupture of lumbar discs with intraspinal protrusion of the nucleus pulposus. A clinical study. *Acta chir. scand.*, Suppl. 144.

Rugtveit, A. (1966) Juvenile lumbar disc herniations. *Acta orthop. scand.* **37,** 348–356.

Taylor, T. K. F. (1971) Intervertebral disc prolapse in children and adolescents. *J. Bone Jt Surg.* **53**-B, 357.

Wahren, H. (1946) Herniated nucleus pulposus in a child of twelve years. *Acta orthop. scand.* **16,** 40–42.

Webb, J. H., Svien, H. J. & Kennedy, R. L. J. (1954) Protruded lumbar intervertebral disks in children. *J. Amer. med. Ass.* **154,** 1153–1154.

Weiss, S. R. & Raskind, R. (1967) The teen-age "Lumbar disk syndrome". *Int. Surg.* **49,** 528–533.

Correspondence to: Ingjald Bjerkreim, Sophies Minde Ortopedisk Hospital, Trondheimsveien 132, Oslo 5, Norway.