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A CASE OF PSEUDOSPONDYLOLISTHESIS WITH AFFECTION OF SPINAL ROOTS

BY

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In recent years the syndrome of lumbosciatica has been the subject of a steadily increasing interest. It has become more and more accessible to operative treatment, since it was established that this syndrome is to be regarded only as a symptom of spinal root affection and may be brought about by various conditions —for instance, disk hernia, caudal tumors, etc. To these I wish to add also pseudospondylolisthesis, as I have had occasion to observe a case of this affection which produced a typical lumbosciatic syndrome. The possibility of pseudospondylolisthesis giving rise to a spinal root affection was predicted already by Stewart—which I shall return to later on.

Pseudospondylolisthesis was described first by Junghanns (1930), who also gave a thorough account of its pathological anatomy and thus elucidated the difference between true spondylolisthesis. The feature common to these two lesions is the forward displacement of a vertebral body in relation to the underlying vertebra. In spondylolisthesis this displacement takes place most often between the fifth lumbar vertebra and the sacrum, but in pseudospondylolisthesis the displacement usually makes its appearance between L.IV and L.V, even though it does occur also between L.V and S.I and between L.III and L.IV (Fig. 1).

The difference, on the other hand, is that in true spondylolisthesis there is always spondylolysis, *i.e.*, separation in the verte-

bral arch, so that only the body of the vertebra together with the pedicles and the upper articular processes slide forwards, while the posterior part of the arch with the lower articular processes and the spinal process remain without any change in their place in relation to the adjacent vertebrae. In pseudospondylolisthesis, on the other hand, there is no such separation in the arch, but the entire vertebra is displaced forward. Junghanns thinks that this forward displacement is made possible

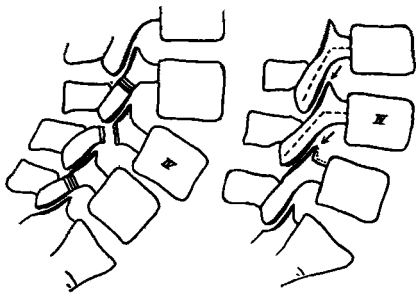


Fig. 1.

Semischematic picture after Junghanns (Arch. Orthop. Chir. *29:* 121, 1930).
A. True spondylolisthesis of L.IV with spondylolysis.
B. Pseudospondylolisthesis of L.IV.

primarily by an increase in the angle between the pedicle and the lower articular process, resulting in an oblique position of the joint and, in the next place, by changes due to arthritis deformans with reduction of the cartilage in these joints (Figs. 2 and 3).

These changes in the articular surfaces are always present in pseudospondylolisthesis, and it is obvious that they make it possible for the entire vertebra to be displaced forwards—something to which the vertebra has a tendency anyhow, on account of the physiological lordosis. Junghanns also discusses the primary cause of the particular changes, though without arriving at any decisive conclusion. He takes the secondary changes in pseudospondylolisthesis to be the same as those in spondylolisthesis: reduction in the height of the underlying intervertebral

disk, sclerosis of the margins of the bodies of the adjoining vertebrae, and lipping of the underlying vertebral body.

Also an American author, T. D. Stewart, has dealt with this question in his account of some very interesting studies on

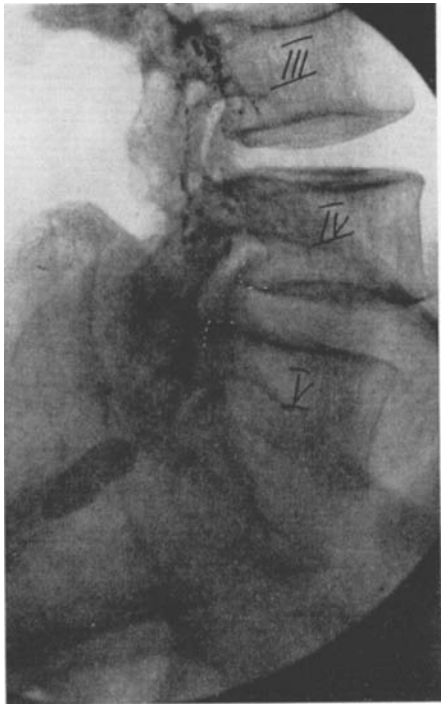


Fig. 2.
F. O. F.-n, 1943/41. Lateral view of the pseudospondylolisthesis of L.IV. No visible separation in the arch.
(Picture taken after the laminectomy; several drops of lipiodol visible.)

a large number of eskimo skeletons, among which he found three cases of pseudospondylolisthesis. In these cases the pathologic-anatomical finding was the same as described by Junghanns. But, in addition, Stewart makes the following remark: "Attention needs to be directed only to the alterations in shape of the neural canal, resulting from erosion and lipping of the

superior articular facets. This point is not brought out in Junghanns' study. It seems probable that here, unlike in true spondylolisthesis, there may be symptoms of spinal nerve compression before much displacement has occurred."

Fig. 3.

F. O. F-n, 1943/41. This picture shows distinctly the changes in the articular facets between L.IV and L.V, (see the others). The joint-gap is narrow and considerably oblique as compared to the one above. Marked sclerosis in the surroundings of the joint-gaps. The upper articular process of L.V is bent forwards, bill-shaped, and is distinctly longer than the corresponding process of L.IV, probably on account of depositing of osteophytes at the tip. The angle between the pedicle and the lower articular process is considerably larger in L.IV than in L.III or L.II.

With regard to the case reported below, Stewart's observation and conclusion are of particular interest. Also a few other

authors have described some cases of pseudospondylolisthesis but without contributing anything particularly new in addition to what has been said already by Junghanns.

I have had the opportunity to observe a case of pseudospondylolisthesis that was treated operatively on account of symptoms from the spinal roots. As far as I know, this is the first time such a case has been treated surgically, and hence I think it will be appropriate to give a more detailed account of it.

CASE RECORD

F. O. F.-n, 1943/41, male, aged 59.

The patient is a mason with a past history of good health except for an attack of appendicitis at the age of 25, and a subsequent attack of otitis media resulting in deafness in the right ear. Three years ago he had a fall from a street car, suffering a wound in the back of his head. This injury did not require hospitalization, and there were no sequelae from the accident.

The present illness commenced about two years ago, in connection with some very strenuous and incommodious work, with severe pain over the loins, radiating down over the posterior surface of both hips and thighs, and down into the calves. To begin with he had pain in both legs, now the pain is limited to the right leg. The pain is constant, but it is intensified by movements and relieved by rest; at times, however, it is severe enough to disturb his sleep. Further, the pain is relieved when the patient lies down with a pillow under the loins. Lately the patient has been coughing and sneezing a good deal, and this has been accompanied by stabbing pain in the back (over the loins) radiating down over the posterior surface of the thighs and down into the calves. This pain has been most pronounced in the right side. Since the onset of this pain, the patient has also noticed some numbness of the feet: when he walks, the feet feel numb as "dead lumps". This numbness ceases when he lies down.

The patient has received physical treatment in dispensaries of various hospitals, without any favourable effect whatever. From March 13 to April 10, 1941, the patient stayed in the Medical Department of the St. Erik's Hospital, where he also was given treatment—without any effect. Since the onset of his illness, two years ago, he has been unable to work, and he has been confined to bed periodically. He was then transferred to the Neurosurgical Department.

Physical Examination on 16/4—41: Well-nourished. Looks healthy.

The patient moves slowly and cautiously and he has difficulty in sitting up in bed. There is a slight limp of the right leg.

The lumbar part of the back is flattened and fixed rigidly. The erectors spinae are firmly contracted over the lumbar region. No scoliosis. Bending forwards to about 60° takes place practically in the hip joints

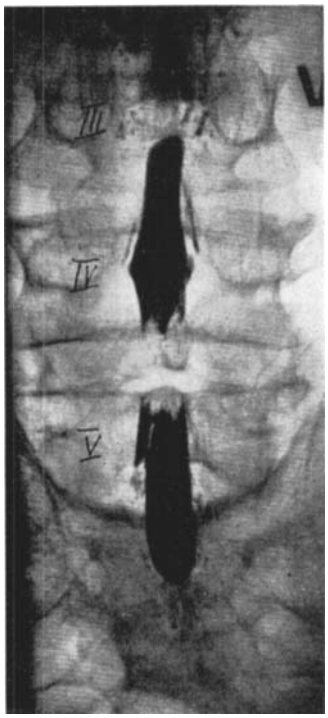


Fig. 4.
F. O. F.-n, 1943/41. Lipiodol myelogram showing impeded passage at the level of the intervertebral disk between L.IV and L.V.

alone. Bending backwards and to the sides is likewise reduced. Tenderness to taps on the spinal process of L.IV—V. Mobility in the hips somewhat reduced. Lasègue's sign positive on the right side at 75°. No pareses. Neurological state otherwise without any abnormalities—apart from bilateral impairment of the hearing.

Spinal fluid: Clear; cells 2/1; Pandy: trace; Nonne: trace. Queckenstedt: No abnormality.

X-ray examination (Dr. Folke Knutsson) showed typical pseudo-

spondylolisthesis of L.IV, with about 6 mm.'s displacement of the vertebral body. Some spondylitis deformans changes are also seen in the lumbar column, besides an old compression fracture of Th. XII.

Myelography with oxygen (Dr. Moberg) showed a roundish curving inwards, from the right and from the back, at the level of the lower part of Th. XII and at the level of the intervertebral space between L.III and L.IV. As this phenomenon appeared somewhat uncertain, the examination was complemented by myelography with lipiodol (5 cc.). This examination showed impeded passage of the lipiodol at the level of the intervertebral space between L.IV and L.V. The lipiodol passed this space very slowly, and although the patient was sitting up for a considerable length of time, not all the lipiodol was able to pass (Fig. 4).

Here then, there was a displacement of the dural tube at the level of the intervertebral space between L.IV and L.V. It was considered most probable that this displacement was produced by a disk hernia or possibly by a hypertrophy of the ligamentum flavum.

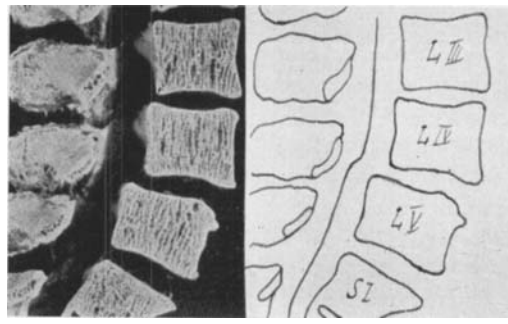
In consideration of the protracted discomfort of the patient, which had proved resistant to all conservative treatment, it was decided that explorative laminectomy was indicated, notwithstanding the roentgenological changes in the skeleton.

On 3/5—41: *Explorative laminectomy* L.IV—L.V (Dr. Sjöqvist). Under local anesthesia, laminectomy was performed on L.IV and L.V. The bone was strikingly soft and porous, also vascularized considerably. The distance between the sacrum and L.V was very short. The entire arches of L.V and L.IV were removed. The dural sac pulsated normally; it was milkish-white in colour, presumably on account of the lipiodol. At the level of the lower margin of the arch of L.IV there was found a distinct bent in the dural tube, which thus took a sort of S-shaped course. Exploration on both sides revealed no disk hernia. Then the dural was opened. The roots in the cauda were slightly adhering to each other but there was not found any sign of an expansive process.

7/6—41: Post-operative course quite uncomplicated. Primary healing of the wound. The pain in the leg and back ceased immediately after the operation and has not returned since. The patient commenced getting up 10 days after the operation; he has been able to move about easily since, and he has even been able lately to ride a bicycle. *Physical exam.:* Back practically quite soft. Free mobility in all directions. No tenderness of the vertebral column or the field of operation. Lasègue negative on both sides. Achilles' reflex absent on the right side. No sensory disturbances. The patient is well satisfied with the result.

In this case, then, there was indisputably an affection of the fourth lumbar roots on both sides. The clinical symptoms of the patient, as well as the roentgenological findings and the

operative findings, together with the immediate improvement of his condition after the laminectomy furnish evidence to this effect. Only a short time has passed since the operation, however. Still, the complete disappearance of symptoms immediately after the operation is a fact to which some significance has to be attributed. Possibly this affection may be explained as a simple compression of the nerve roots. Yet it seems more likely



A B

Fig. 5.

A. Photograph of the lumbar column, in sagittal section, with pseudospondylolisthesis between L.IV and L.V, after Junghanns. There appears to be a distinct bend on the spinal canal at the border between L.IV and L.V.

B. Semischematic drawing of Fig. 5 A, in order to illustrate better the bend on the spinal canal.

that the nerve roots were being stretched when the vertebra moved forwards, and that this stretching was abolished by the laminectomy when the cauda was given a chance to get back into its normal position. Such a compression or stretching of the nerve roots is explainable on consideration of the pathological anatomy of pseudospondylolisthesis. A contrast to true spondylolisthesis, in which the posterior part of the vertebral arch remains in situ while the vertebral body moves forwards—which means that no displacement or bending of the spinal canal can take place except in extreme degrees of the lesion—in pseudospondylolisthesis the entire vertebral arch accompanies the

vertebral body in the displacement, so that a bending of the spinal canal is unavoidable (Fig. 5).

That this condition gives clinical symptoms but seldom can be explained only by the circumstance that most often the displacement in pseudospondylolisthesis does not exceed a few millimeters, which thus is not enough to cause compression or stretching of the roots or cauda. It is also possible that the lipping of the articular facets in the above-mentioned case may have contributed to a compression. This possibility has also been pointed out by Stewart.

The outcome of the above will then be that a high degree of pseudospondylolisthesis may give rise to an affection of the spinal roots and give clinical symptoms which essentially do not differ from the "typical" sciatic syndrome.

In conclusion I wish to acknowledge my indebtedness to Dr. Folke Knutsson and Dr. Moberg for their assistance in interpreting the X-ray findings.

I am greatly obliged to Dr. Sjöqvist for permission to publish this case.

SUMMARY

The author gives an account of a case of pseudospondylolisthesis of the fourth lumbar vertebra with symptoms of root compression in the form of typical sciatic syndrome. Lipiodol myelogram showed a displacement of the dural sac at the level of the intervertebral disk between L.IV and L.V.

On laminectomy of the arches of L.IV and L.V, the arch of L.IV was found to lie close against the cauda, making thus an S-shaped bent on the spinal canal at the level of the pseudospondylolisthetic vertebra.

After the laminectomy the patient was completely free from symptoms.

RÉSUMÉ

L'auteur rend compte d'un cas de pseudospondylolisthésis de la vertèbre lombaire IV avec symptôme de compression sous forme de syndrome sciatique typique. Le lipiodolmyélogramme montrait un déplacement de la *dure-mère* au niveau du disque intervertébral entre les vertèbres lombaires IV et V. La laminectomie des lames vertébrales lombaires IV et V montra que dans la vertébre lombaire IV l'arc était tout proche de l'apophyse épineuse tandis qu'un coude du canal rachidien en forme de S pouvait être observé à la hauteur de la vertèbre pseudospondylolisthétique. Après la laminectomie, le malade ne présentait aucun symptôme.

ZUSAMMENFASSUNG

Verfasser berichtet über einen Fall von Pseudospondylolisthesis von L. 4 mit Wurzelkompressionssymptomen in Form eines typischen Ischiassyndroms. Das Lipiodolmyelogramm zeigte eine Verdrängung des Duralsacks in Höhe der Zwischenwirbelscheibe zwischen L. 4 und L. 5. Bei Laminektomie der Bögen von L. 4 und L. 5 zeigte es sich, dass der Bogen von L. 4 ganz dicht an der Cauda lag, wodurch in Höhe des pseudospondylolisthetischen Wirbels ein S-förmiger Knick des Spinalkanals entstanden war. Nach der Laminektomie war Pat. vollständig symptomfrei.

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